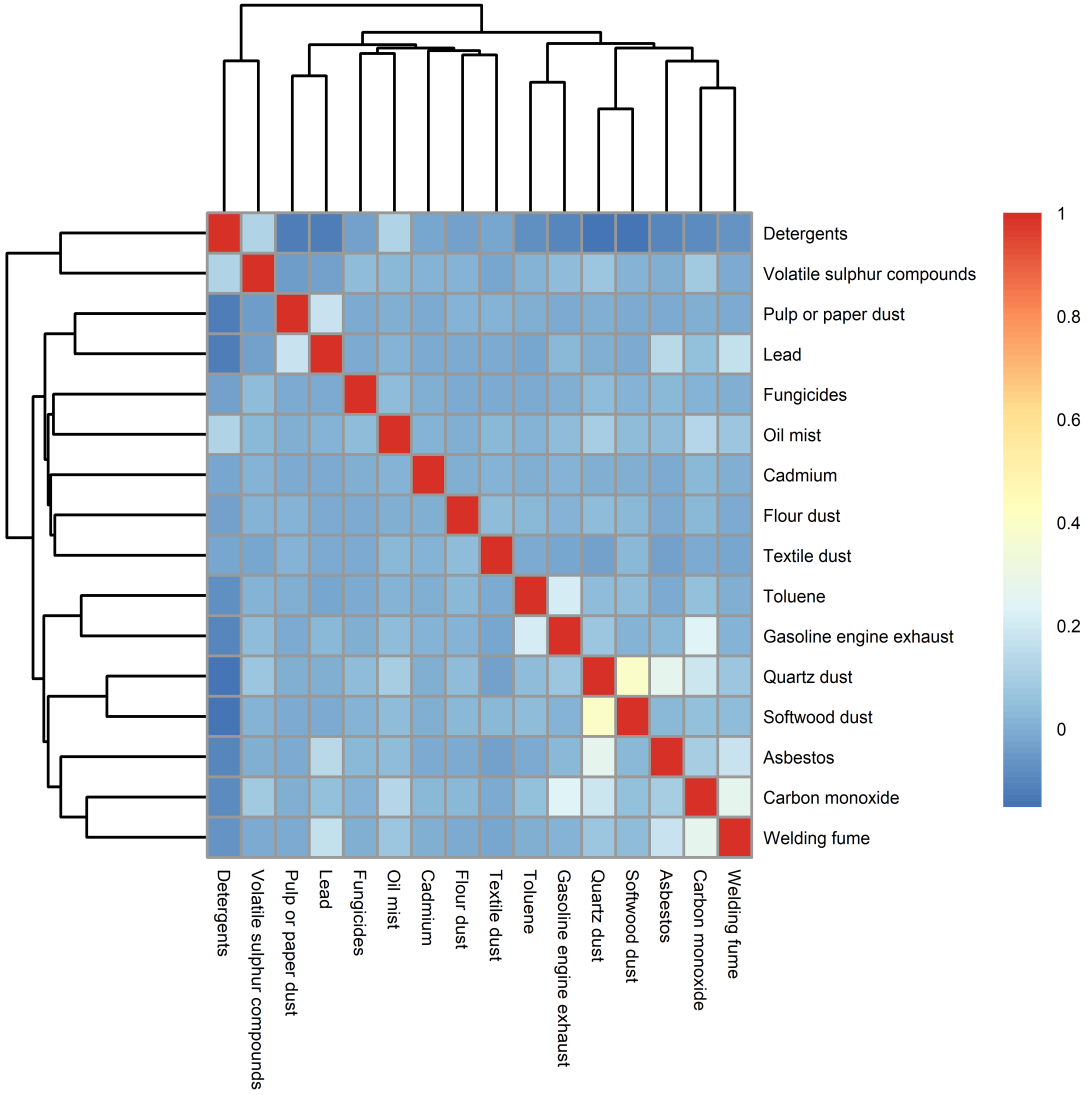
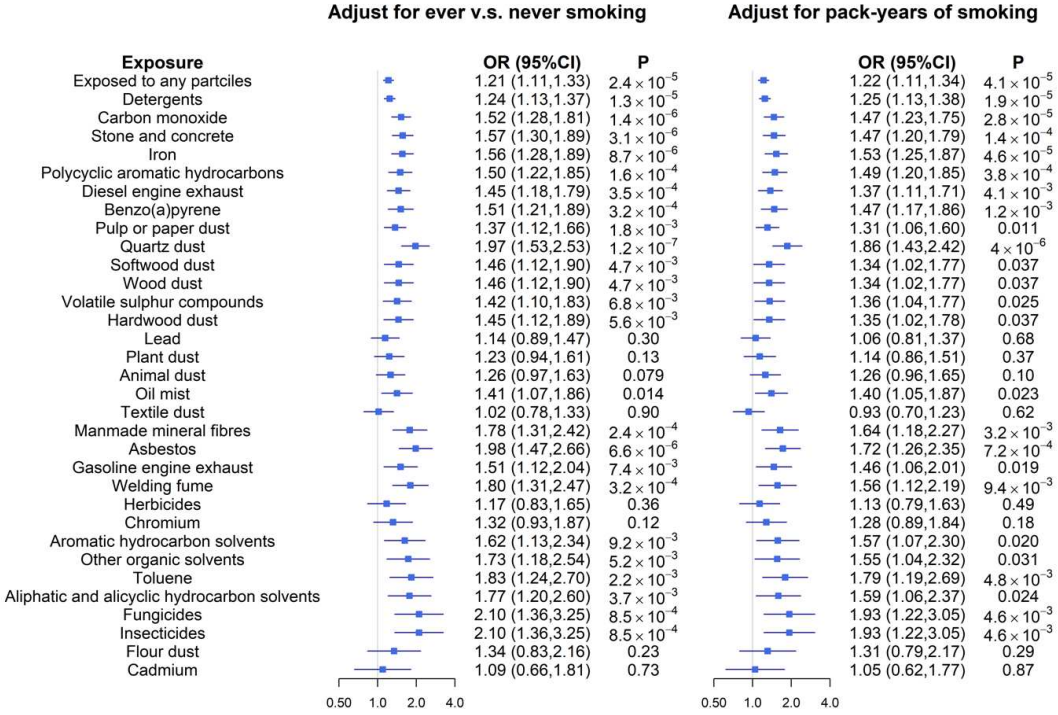
Supplementary Figure 1. Pairwise correlation of 16 independent occupational inhalable agents identified after clumping.



Supplementary Figure 2. Associations between occupational inhalable agents and the risk for overall RA. Estimates were adjusted for age, sex, residential area, smoking (ever / never smoking or pack-years), alcohol drinking, education, and body mass index.



Supplementary Table 1. Primary associations of occupational inhalable agents with risk for overall RA, ACPA-positive subtype, and ACPA-negative subtype. Estimates were adjusted for age, sex, residential areas, smoking, alcohol drinking, education, and body mass index.

Exposure	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
Not exposed to any agents (Ref.)	1098/2114	**1.00 (Ref.)**		714/2114	**1.00 (Ref.)**		384/2114	**1.00 (Ref.)**	
Exposed to any agents	2935/4371	1.21 (1.11,1.33)	**2.4×10^{-5}**	1928/4371	1.25 (1.12,1.38)	**3.9×10^{-5}**	1007/4371	1.18 (1.03,1.34)	0,016
Detergents	1980/2792	1.24 (1.13,1.37)	**1.3×10^{-5}**	1308/2792	1.27 (1.13,1.42)	**3.7×10^{-5}**	672/2792	1.22 (1.06,1.41)	**6.8×10^{-3}**
Carbon monoxide	577/655	1.52 (1.28,1.81)	**1.4×10^{-6}**	385/655	1.67 (1.37,2.04)	**3.9×10^{-7}**	192/655	1.35 (1.06,1.73)	**0.020**
Stone and concrete	467/494	1.57 (1.30,1.89)	**3.1×10^{-6}**	298/494	1.71 (1.37,2.13)	**1.8×10^{-6}**	169/494	1.39 (1.07,1.81)	**0.010**
Iron	409/453	1.56 (1.28,1.89)	**8.7×10^{-6}**	272/453	1.73 (1.38,2.17)	**2.3×10^{-6}**	137/453	1.34 (1.02,1.78)	**0.040**
Polycyclic aromatic hydrocarbons	308/356	1.50 (1.22,1.85)	**1.6×10^{-4}**	206/356	1.71 (1.34,2.19)	**1.5×10^{-5}**	102/356	1.24 (0.92,1.68)	0.16
Diesel engine exhaust	299/337	1.45 (1.18,1.79)	**3.5×10^{-4}**	200/337	1.69 (1.34,2.14)	**1.2×10^{-5}**	99/337	1.16 (0.86,1.56)	0.33
Benzo(a)pyrene	263/306	1.51 (1.21,1.89)	**3.2×10^{-4}**	176/306	1.75 (1.35,2.27)	**2.8×10^{-5}**	87/306	1.22 (0.88,1.69)	0.23
Pulp or paper dust	239/308	1.37 (1.12,1.66)	1.8×10^{-3}	173/308	1.57 (1.26,1.96)	**5.6×10^{-5}**	66/308	1.02 (0.75,1.39)	0.90
Quartz dust	243/221	1.97 (1.53,2.53)	**1.2×10^{-7}**	154/221	2.18 (1.63,2.94)	**2.2×10^{-7}**	89/221	1.72 (1.22,2.44)	**2.0×10^{-3}**
Softwood dust	162/200	1.46 (1.12,1.90)	4.7×10^{-3}	99/200	1.57 (1.15,2.14)	4.8×10^{-3}	63/200	1.34 (0.93,1.93)	0.12
Wood dust	162/200	1.46 (1.12,1.90)	4.7×10^{-3}	99/200	1.57 (1.15,2.14)	4.8×10^{-3}	63/200	1.34 (0.93,1.93)	0.12
Volatile sulphur compounds	168/191	1.42 (1.10,1.83)	6.8×10^{-3}	108/191	1.56 (1.16,2.09)	3.2×10^{-3}	60/191	1.22 (0.85,1.74)	0.28
Hardwood dust	159/197	1.45 (1.12,1.89)	5.6×10^{-3}	97/197	1.56 (1.14,2.13)	5.7×10^{-3}	62/197	1.34 (0.93,1.93)	0.12
Lead	136/205	1.14 (0.89,1.47)	0.30	95/205	1.34 (1.01,1.79)	0.040	41/205	0.86 (0.59,1.26)	0.44
Plant dust	136/182	1.23 (0.94,1.61)	0.13	85/182	1.33 (0.97,1.81)	0.080	51/182	1.07 (0.73,1.56)	0.73
Animal dust	131/181	1.26 (0.97,1.63)	0.080	80/181	1.26 (0.93,1.70)	0.14	51/181	1.24 (0.86,1.78)	0.25
Oil mist	133/161	1.41 (1.07,1.86)	0.010	90/161	1.68 (1.22,2.30)	**1.5×10^{-3}**	43/161	1.10 (0.74,1.65)	0.63
Textile dust	118/169	1.02 (0.78,1.33)	0.90	76/169	1.05 (0.77,1.43)	0.75	42/169	0.99 (0.67,1.46)	0.97
Manmade mineral fibres	135/139	1.78 (1.31,2.42)	**2.4×10^{-4}**	85/139	2.12 (1.47,3.06)	**5.3×10^{-5}**	50/139	1.41 (0.93,2.16)	0.11
Asbestos	143/130	1.98 (1.47,2.66)	**6.6×10^{-6}**	88/130	2.22 (1.56,3.15)	**9.5×10^{-6}**	55/130	1.75 (1.17,2.59)	**5.8×10^{-3}**
Gasoline engine exhaust	116/126	1.51 (1.12,2.04)	7.4×10^{-3}	75/126	1.79 (1.26,2.53)	**1.0×10^{-3}**	41/126	1.20 (0.78,1.85)	0.39
Welding fume	111/111	1.80 (1.31,2.47)	**3.2×10^{-4}**	74/111	2.13 (1.47,3.08)	**6.7×10^{-5}**	37/111	1.39 (0.89,2.19)	0.15
Herbicides	69/110	1.17 (0.83,1.65)	0.36	41/110	1.21 (0.81,1.83)	0.35	28/110	1.07 (0.66,1.72)	0.78
Chromium	69/92	1.32 (0.93,1.87)	0.12	47/92	1.57 (1.05,2.33)	0.030	22/92	1.06 (0.63,1.79)	0.81
Aromatic hydrocarbon solvents	72/73	1.62 (1.13,2.34)	9.2×10^{-3}	47/73	1.94 (1.28,2.94)	1.9×10^{-3}	25/73	1.29 (0.77,2.16)	0.33
Other organic solvents	64/63	1.73 (1.18,2.54)	5.2×10^{-3}	41/63	1.93 (1.24,3.01)	3.4×10^{-3}	23/63	1.49 (0.88,2.55)	0.14
Toluene	65/61	1.83 (1.24,2.70)	2.2×10^{-3}	43/61	2.24 (1.44,3.48)	**3.3×10^{-4}**	22/61	1.44 (0.83,2.48)	0.20
Aliphatic and alicyclic hydrocarbon solvents	64/62	1.77 (1.20,2.60)	3.7×10^{-3}	41/62	1.98 (1.27,3.08)	2.5×10^{-3}	23/62	1.54 (0.90,2.63)	0.11
Fungicides	50/42	2.10 (1.36,3.25)	**8.5×10^{-4}**	34/42	2.38 (1.46,3.87)	**4.9×10^{-4}**	16/42	1.79 (0.97,3.31)	0.060
Insecticides	50/42	2.10 (1.36,3.25)	**8.5×10^{-4}**	34/42	2.38 (1.46,3.87)	**4.9×10^{-4}**	16/42	1.79 (0.97,3.31)	0.060
Flour dust	35/44	1.34 (0.83,2.16)	0.23	20/44	1.36 (0.77,2.41)	0.30	15/44	1.24 (0.65,2.36)	0.52
Cadmium	29/41	1.09 (0.66,1.81)	0.73	22/41	1.36 (0.78,2.36)	0.28	7/41	0.75 (0.32,1.73)	0.50

Supplementary Table 2. Associations of occupational inhalable agents with risk for RA, stratified by sex. Estimates were adjusted for age, residential areas, smoking, alcohol drinking, education, and body mass index. The sex difference regarding the risk of developing RA was tested by adding an interaction term between sex and exposure to any occupational inhalable agents in one logistical regression model, and the P value for the interaction term was used as an indicator for sex difference.

Sex	Exposure	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
		N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
Men	**Not exposed to any agents (Ref.)**	207/508	**1.00 (Ref.)**		113/508	**1.00 (Ref.)**		94/508	**1.00 (Ref.)**	
	Exposed to any agents	972/1368	1.40 (1.15,1.70)	**7.4×10^{-4}**	621/1368	1.66 (1.30,2.11)	**4.2×10^{-5}**	351/1368	1.14 (0.87,1.49)	0.33
Women	**Not exposed to any agents (Ref.)**	891/1606	**1.00 (Ref.)**		601/1606	**1.00 (Ref.)**		290/1606	**1.00 (Ref.)**	
	Exposed to any agents	1963/3003	1.13 (1.02,1.25)	**0.022**	1307/3003	1.13 (1.00,1.27)	0.05	656/3003	1.15 (0.98,1.34)	0.083
P for sex difference			**0.01**			**0.002**			0.88	

Supplementary Table 3. Exposure-response relationship between exposure to multiple occupational agents and risk of RA. Participants were classified in to exposed to 1, 2, 3, 4, or >=5 kinds of agents out of the 16 independent agents and compared to non-exposed group (not exposed to any of the 32 agents). Estimates were adjusted for age, sex, residential areas, smoking, alcohol drinking, education, and body mass index.

RA	# Agents	N (case / control)	OR (95%CI)	P	P_{trend}
Overall RA	0*	1098/2114	1.00 ref.		**<0.001**
	1	1570/2418	1.18 (1.07,1.30)	1.1×10^{-3}	
	2	587/782	1.31 (1.14,1.51)	1.2×10^{-4}	
	3	259/279	1.58 (1.30,1.93)	5.1×10^{-6}	
	4	116/107	1.76 (1.32,2.35)	1.2×10^{-4}	
	5	59/40	2.29 (1.50,3.51)	1.4×10^{-4}	
ACPA-positive RA	0*	714/2114	1.00 ref.		**<0.001**
	1	1041/2418	1.20 (1.07,1.35)	1.8×10^{-3}	
	2	378/782	1.34 (1.14,1.57)	4.3×10^{-4}	
	3	168/279	1.66 (1.32,2.08)	1.1×10^{-5}	
	4	79/107	2.00 (1.45,2.77)	2.6×10^{-5}	
	5	41/40	2.70 (1.69,4.32)	3.3×10^{-5}	
ACPA-negative RA	0*	384/2114	1.00 ref.		**<0.001**
	1	529/2418	1.16 (1.00,1.35)	0.050	
	2	209/782	1.30 (1.06,1.59)	0.010	
	3	91/279	1.49 (1.13,1.98)	4.9×10^{-3}	
	4	37/107	1.43 (0.95,2.17)	0.090	
	5	18/40	1.86 (1.03,3.36)	0.040	

Supplementary Table 4. Exposure-response relationship between duration of exposure to any inhalable agents and risk of RA. Participants were grouped into five subsets within exposure duration of 0-3.3, 3.3-8.0, 8.0-1.5, 1.5-24.0, 24.0-51.0 years and compared to non-exposed group (not exposed to any of the 32 agents). Estimates were adjusted for age, sex, residential areas, smoking, alcohol drinking, education, and body mass index.

RA	# Quantile of exposure duration	N (case / control)	OR (95%CI)	P	P_{trend}
Overall RA	0*	1098/2114	1.00 ref.		**<0.001**
	1	476/789	1.09 (0.95,1.26)	0.21	
	2	517/769	1.18 (1.03,1.35)	0.019	
	3	567/704	1.41 (1.23,1.61)	1.0×10^{-6}	
	4	529/695	1.32 (1.15,1.52)	9.4×10^{-5}	
	5	540/722	1.28 (1.11,1.49)	7.6×10^{-4}	
ACPA-positive RA	0*	714/2114	1.00 ref.		**<0.001**
	1	310/789	1.06 (0.90,1.25)	0.49	
	2	344/769	1.19 (1.02,1.40)	0.028	
	3	375/704	1.43 (1.22,1.67)	7.0×10^{-6}	
	4	370/695	1.46 (1.24,1.71)	3.3×10^{-6}	
	5	332/722	1.32 (1.11,1.57)	1.4×10^{-3}	
ACPA-negative RA	0*	384/2114	1.00 ref.		0.016
	1	166/789	1.17 (0.95,1.43)	0.14	
	2	173/769	1.19 (0.97,1.45)	0.097	
	3	192/704	1.38 (1.13,1.68)	1.4×10^{-3}	
	4	159/695	1.11 (0.90,1.37)	0.33	
	5	208/722	1.25 (1.02,1.54)	0.032	

Supplementary Table 5. The combined effects of occupational inhalable agents, smoking, and high genetic risk score with risk of RA. Estimates were adjusted for age, sex, residential areas, body mass index, levels of education, alcohol drinking, and principal components 1-10. For the OR estimates that were not available due to the limited number of cases within the subgroup, 'not applicable' was marked in corresponding cells.

Occupational exposure	Smoking	GRS	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
			N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
The sixteen independent agents											
Asbestos											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	2/6	0.94 (0.18,4.85)	0.94	1/6	2.51 (0.28,22.42)	0.41	1/6	0.45 (0.05,3.91)	0.47
-	+	-	139/228	1.44 (1.04,2)	0.028	60/228	2.82 (1.66,4.79)	1.2×10^{-4}	79/228	1.01 (0.69,1.48)	0.95
-	-	+	263/182	3.19 (2.34,4.35)	2.5×10^{-13}	193/182	10.19 (6.3,16.47)	2.7×10^{-21}	70/182	1.10 (0.74,1.63)	0.63
+	+	-	22/27	1.86 (0.96,3.61)	0.066	10/27	4.98 (2.02,12.31)	5.0×10^{-4}	12/27	0.98 (0.44,2.19)	0.97
-	+	+	435/236	4.36 (3.25,5.85)	1.0×10^{-22}	338/236	15.76 (9.84,25.25)	1.9×10^{-30}	97/236	1.19 (0.83,1.72)	0.35
+	-	+	23/11	4.99 (2.22,11.17)	9.5×10^{-5}	14/11	17.40 (6.6,45.88)	7.7×10^{-9}	9/11	1.85 (0.7,4.89)	0.21
+	+	+	68/18	9.10 (4.91,16.86)	2.3×10^{-12}	49/18	35.24 (16.48,75.35)	4.0×10^{-20}	19/18	2.64 (1.24,5.61)	0.012
Cadmium											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	1/3	0.56 (0.06,5.61)	0.62	1/3	2.34 (0.23,24.17)	0.48	0/3	Not applicable	NA
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.81 (1.65,4.78)	1.3×10^{-4}	79/228	1.02 (0.7,1.5)	0.90
-	-	+	263/182	3.21 (2.35,4.39)	2.3×10^{-13}	193/182	10.25 (6.33,16.61)	3.3×10^{-21}	70/182	1.10 (0.74,1.64)	0.63
+	+	-	2/6	0.73 (0.14,3.83)	0.71	2/6	3.56 (0.66,19.27)	0.14	0/6	Not applicable	NA
-	+	+	435/236	4.41 (3.28,5.93)	7.4×10^{-23}	338/236	16.00 (9.96,25.71)	2.1×10^{-30}	97/236	1.22 (0.84,1.77)	0.29
+	-	+	5/4	2.38 (0.59,9.64)	0.22	3/4	7.13 (1.4,36.29)	0.018	2/4	1.01 (0.16,6.22)	0.99
+	+	+	19/4	8.44 (2.67,26.69)	2.8×10^{-4}	14/4	31.32 (8.92,110.02)	7.7×10^{-8}	5/4	2.49 (0.57,10.9)	0.22
Carbon monoxide											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	24/50	1.02 (0.58,1.79)	0.96	9/50	1.86 (0.79,4.38)	0.15	15/50	0.83 (0.42,1.61)	0.57
-	+	-	139/228	1.45 (1.05,2.02)	0.025	60/228	2.78 (1.64,4.7)	1.4×10^{-4}	79/228	1.05 (0.72,1.53)	0.79
-	-	+	263/182	3.23 (2.37,4.41)	1.3×10^{-13}	193/182	10.30 (6.39,16.61)	1.2×10^{-21}	70/182	1.14 (0.77,1.69)	0.51
+	+	-	85/97	1.84 (1.22,2.77)	3.8×10^{-3}	37/97	3.59 (1.94,6.63)	4.6×10^{-5}	48/97	1.33 (0.82,2.17)	0.24
-	+	+	435/236	4.47 (3.33,6)	1.5×10^{-23}	338/236	15.82 (9.91,25.26)	5.7×10^{-31}	97/236	1.28 (0.89,1.84)	0.19

+	-	+	85/42	4.12 (2.56,6.62)	4.9×10^{-9}	57/42	12.72 (6.82,23.73)	1.3×10^{-15}	28/42	1.60 (0.88,2.91)	0.13
+	+	+	305/106	6.36 (4.43,9.12)	8.9×10^{-24}	238/106	23.48 (13.91,39.64)	3.4×10^{-32}	67/106	1.65 (1.06,2.59)	0.028
Detergents											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	119/271	1.00 (0.72,1.38)	0.98	41/271	1.47 (0.86,2.52)	0.16	78/271	0.84 (0.58,1.22)	0.37
-	+	-	139/228	1.45 (1.05,2)	0.025	60/228	2.58 (1.54,4.32)	3.1×10^{-4}	79/228	1.07 (0.73,1.55)	0.73
-	-	+	263/182	3.25 (2.39,4.42)	6.8×10^{-14}	193/182	9.83 (6.14,15.72)	1.5×10^{-21}	70/182	1.17 (0.79,1.72)	0.44
+	+	-	280/355	1.79 (1.34,2.39)	8.6×10^{-5}	123/355	3.37 (2.1,5.41)	4.4×10^{-7}	157/355	1.29 (0.93,1.8)	0.13
-	+	+	435/236	4.41 (3.30,5.89)	1.2×10^{-23}	338/236	14.48 (9.18,22.84)	1.4×10^{-30}	97/236	1.30 (0.91,1.87)	0.15
+	-	+	332/272	2.65 (1.98,3.55)	6.5×10^{-11}	232/272	7.57 (4.79,11.97)	4.8×10^{-18}	100/272	1.05 (0.73,1.5)	0.79
+	+	+	940/383	5.67 (4.32,7.43)	4.3×10^{-36}	719/383	18.41 (11.83,28.65)	3.7×10^{-38}	221/383	1.76 (1.28,2.43)	4.8×10^{-4}
Flour dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	4/3	4.00 (0.84,19.01)	0.082	1/3	5.67 (0.55,58.64)	0.15	3/3	3.66 (0.66,20.26)	0.14
-	+	-	139/228	1.45 (1.05,2.02)	0.025	60/228	2.83 (1.67,4.81)	1.2×10^{-4}	79/228	1.04 (0.71,1.52)	0.83
-	-	+	263/182	3.18 (2.33,4.34)	3.6×10^{-13}	193/182	10.15 (6.27,16.43)	4.2×10^{-21}	70/182	1.09 (0.74,1.63)	0.65
+	+	-	3/6	0.98 (0.23,4.12)	0.98	2/6	2.90 (0.53,15.96)	0.22	1/6	0.36 (0.04,3.28)	0.37
-	+	+	435/236	4.41 (3.28,5.92)	7.2×10^{-23}	338/236	15.93 (9.92,25.57)	2.0×10^{-30}	97/236	1.24 (0.86,1.79)	0.25
+	-	+	10/9	2.32 (0.87,6.15)	0.091	6/9	8.00 (2.45,26.09)	5.7×10^{-4}	4/9	0.75 (0.21,2.67)	0.65
+	+	+	16/6	5.77 (2.08,15.98)	7.4×10^{-4}	11/6	20.88 (6.41,68)	4.5×10^{-7}	5/6	1.99 (0.53,7.48)	0.31
Fungicides											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	3/4	1.55 (0.31,7.68)	0.59	0/4	Not applicable	NA	3/4	1.83 (0.35,9.46)	0.47
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.82 (1.66,4.78)	1.3×10^{-4}	79/228	1.03 (0.7,1.5)	0.89
-	-	+	263/182	3.19 (2.33,4.35)	3.3×10^{-13}	193/182	10.06 (6.22,16.27)	4.8×10^{-21}	70/182	1.11 (0.74,1.64)	0.62
+	+	-	7/7	2.41 (0.78,7.44)	0.13	2/7	3.86 (0.73,20.48)	0.11	5/7	2.31 (0.65,8.2)	0.20
-	+	+	435/236	4.38 (3.26,5.88)	1.2×10^{-22}	338/236	15.75 (9.82,25.27)	2.7×10^{-30}	97/236	1.22 (0.84,1.76)	0.30
+	-	+	10/6	3.35 (1.11,10.06)	0.031	8/6	12.05 (3.57,40.65)	6.0×10^{-5}	2/6	0.81 (0.15,4.4)	0.81
+	+	+	25/3	18.77 (5.40,65.24)	3.9×10^{-6}	19/3	68.16 (17.93,259.08)	5.8×10^{-10}	6/3	5.68 (1.31,24.64)	0.020
Gasoline engine exhaust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	5/14	0.83 (0.27,2.5)	0.74	1/14	0.77 (0.09,6.57)	0.81	4/14	0.74 (0.22,2.51)	0.62
-	+	-	139/228	1.43 (1.03,1.98)	0.034	60/228	2.75 (1.62,4.66)	1.7×10^{-4}	79/228	1.01 (0.69,1.48)	0.95
-	-	+	263/182	3.15 (2.31,4.3)	5.1×10^{-13}	193/182	9.94 (6.15,16.07)	6.4×10^{-21}	70/182	1.09 (0.74,1.62)	0.66

	+	+	-	23/17	2.94 (1.44,6)	3.0×10^{-3}	10/17	7.81 (3.02,20.23)	2.3×10^{-5}	13/17	1.74 (0.76,3.96)	0.19
	-	+	+	435/236	4.33 (3.23,5.82)	1.9×10^{-22}	338/236	15.55 (9.71,24.89)	3.2×10^{-30}	97/236	1.20 (0.83,1.74)	0.32
	+	-	+	14/6	5.15 (1.85,14.35)	1.7×10^{-3}	9/6	16.33 (5.07,52.57)	2.9×10^{-6}	5/6	1.99 (0.53,7.47)	0.31
	+	+	+	65/15	10.15 (5.21,19.76)	9.7×10^{-12}	51/15	45.13 (20.52,99.23)	2.7×10^{-21}	14/15	2.00 (0.83,4.83)	0.12
Lead												
	-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
	+	-	-	8/11	1.70 (0.65,4.45)	0.28	5/11	5.03 (1.56,16.24)	6.9×10^{-3}	3/11	0.73 (0.19,2.79)	0.64
	-	+	-	139/228	1.42 (1.02,1.97)	0.035	60/228	2.75 (1.63,4.67)	1.7×10^{-4}	79/228	1.00 (0.68,1.46)	10
	-	-	+	263/182	3.19 (2.34,4.36)	2.6×10^{-13}	193/182	10.05 (6.22,16.24)	4.0×10^{-21}	70/182	1.11 (0.75,1.64)	0.61
	+	+	-	21/35	1.36 (0.73,2.54)	0.33	11/35	3.16 (1.36,7.35)	7.3×10^{-3}	10/35	0.83 (0.37,1.85)	0.65
	-	+	+	435/236	4.34 (3.23,5.82)	1.4×10^{-22}	338/236	15.54 (9.71,24.87)	2.6×10^{-30}	97/236	1.19 (0.82,1.72)	0.35
	+	-	+	28/12	5.29 (2.51,11.13)	1.2×10^{-5}	20/12	19.63 (8.18,47.12)	2.7×10^{-11}	8/12	1.70 (0.64,4.54)	0.29
	+	+	+	63/33	4.38 (2.62,7.31)	1.7×10^{-8}	51/33	18.33 (9.52,35.29)	3.2×10^{-18}	12/33	0.85 (0.4,1.81)	0.67
Oil mist												
	-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
	+	-	-	3/11	0.55 (0.14,2.16)	0.39	0/11	Not applicable	NA	3/11	0.61 (0.15,2.41)	0.48
	-	+	-	139/228	1.44 (1.04,2)	0.028	60/228	2.76 (1.63,4.66)	1.5×10^{-4}	79/228	1.03 (0.71,1.51)	0.87
	-	-	+	263/182	3.16 (2.32,4.32)	3.8×10^{-13}	193/182	9.88 (6.14,15.92)	4.4×10^{-21}	70/182	1.11 (0.75,1.65)	0.60
	+	+	-	19/27	1.77 (0.90,3.47)	0.10	10/27	4.63 (1.9,11.28)	7.6×10^{-4}	9/27	1.02 (0.42,2.45)	0.97
	-	+	+	435/236	4.33 (3.23,5.81)	1.6×10^{-22}	338/236	15.29 (9.58,24.4)	2.8×10^{-30}	97/236	1.21 (0.84,1.75)	0.31
	+	-	+	15/19	1.56 (0.73,3.33)	0.25	11/19	5.79 (2.32,14.44)	1.7×10^{-4}	4/19	0.39 (0.12,1.26)	0.12
	+	+	+	74/23	7.06 (4.00,12.45)	1.5×10^{-11}	57/23	28.37 (14.01,57.47)	1.5×10^{-20}	17/23	1.60 (0.76,3.36)	0.22
Pulp or paper dust												
	-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
	+	-	-	13/34	0.77 (0.38,1.56)	0.46	5/34	1.24 (0.41,3.7)	0.70	8/34	0.58 (0.25,1.34)	0.20
	-	+	-	139/228	1.47 (1.06,2.03)	0.022	60/228	2.93 (1.72,4.98)	7.3×10^{-5}	79/228	1.03 (0.71,1.5)	0.88
	-	-	+	263/182	3.21 (2.35,4.39)	2.1×10^{-13}	193/182	10.41 (6.42,16.89)	2.1×10^{-21}	70/182	1.13 (0.77,1.68)	0.53
	+	+	-	32/33	2.26 (1.28,3.96)	4.6×10^{-3}	18/33	5.92 (2.79,12.54)	3.5×10^{-6}	14/33	1.42 (0.69,2.9)	0.34
	-	+	+	435/236	4.43 (3.30,5.95)	4.4×10^{-23}	338/236	16.32 (10.16,26.21)	7.4×10^{-31}	97/236	1.24 (0.86,1.79)	0.25
	+	-	+	46/26	3.72 (2.13,6.48)	3.7×10^{-6}	33/26	12.30 (6.11,24.74)	1.9×10^{-12}	13/26	1.26 (0.6,2.65)	0.55
	+	+	+	115/53	4.72 (3.10,7.21)	6.2×10^{-13}	93/53	18.36 (10.37,32.51)	1.8×10^{-23}	22/53	1.06 (0.59,1.92)	0.85
Quartz dust												
	-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
	+	-	-	10/14	1.68 (0.69,4.1)	0.25	3/14	2.52 (0.64,9.93)	0.19	7/14	1.34 (0.48,3.72)	0.57

-	+	-	139/228	1.43 (1.03,1.98)	0.033	60/228	2.76 (1.63,4.67)	1.5×10^{-4}	79/228	1.01 (0.69,1.48)	0.95
-	-	+	263/182	3.20 (2.34,4.36)	2.2×10^{-13}	193/182	9.91 (6.15,15.96)	4.3×10^{-21}	70/182	1.12 (0.76,1.66)	0.56
+	+	-	38/35	2.34 (1.31,4.15)	3.9×10^{-3}	16/35	5.14 (2.31,11.44)	6.2×10^{-5}	22/35	1.53 (0.77,3.01)	0.22
-	+	+	435/236	4.36 (3.25,5.84)	9.1×10^{-23}	338/236	15.33 (9.6,24.46)	2.6×10^{-30}	97/236	1.21 (0.84,1.75)	0.31
+	-	+	34/18	4.25 (2.19,8.26)	2.0×10^{-5}	20/18	13.04 (5.7,29.85)	1.2×10^{-9}	14/18	1.78 (0.79,3.99)	0.16
+	+	+	127/37	8.12 (4.97,13.26)	5.5×10^{-17}	94/37	31.60 (16.64,59.99)	4.7×10^{-26}	33/37	2.16 (1.17,3.99)	0.014
Softwood dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/19	1.41 (0.60,3.29)	0.43	1/19	0.72 (0.09,5.97)	0.76	9/19	1.43 (0.57,3.55)	0.45
-	+	-	139/228	1.46 (1.05,2.03)	0.024	60/228	2.83 (1.67,4.81)	1.1×10^{-4}	79/228	1.05 (0.72,1.53)	0.81
-	-	+	263/182	3.22 (2.36,4.4)	1.8×10^{-13}	193/182	10.12 (6.25,16.36)	4.0×10^{-21}	70/182	1.14 (0.77,1.69)	0.51
+	+	-	22/30	1.63 (0.86,3.1)	0.14	9/30	3.31 (1.32,8.28)	0.010	13/30	1.11 (0.51,2.41)	0.80
-	+	+	435/236	4.46 (3.32,5.99)	3.1×10^{-23}	338/236	15.85 (9.88,25.41)	1.8×10^{-30}	97/236	1.25 (0.86,1.8)	0.24
+	-	+	27/17	3.53 (1.77,7.05)	3.5×10^{-4}	17/17	11.60 (4.93,27.28)	1.9×10^{-8}	10/17	1.34 (0.55,3.23)	0.52
+	+	+	83/31	6.43 (3.81,10.83)	2.9×10^{-12}	58/31	25.72 (13.08,50.58)	4.8×10^{-21}	25/31	1.87 (0.97,3.61)	0.060
Textile dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	8/19	0.78 (0.32,1.92)	0.59	2/19	0.96 (0.2,4.56)	0.96	6/19	0.74 (0.27,2.04)	0.55
-	+	-	139/228	1.45 (1.05,2.02)	0.026	60/228	2.82 (1.66,4.79)	1.3×10^{-4}	79/228	1.05 (0.72,1.53)	0.82
-	-	+	263/182	3.19 (2.33,4.36)	3.5×10^{-13}	193/182	10.20 (6.3,16.52)	3.7×10^{-21}	70/182	1.10 (0.74,1.64)	0.63
+	+	-	20/30	1.40 (0.73,2.68)	0.32	12/30	3.89 (1.68,9)	1.5×10^{-3}	8/30	0.65 (0.27,1.57)	0.34
-	+	+	435/236	4.45 (3.31,5.98)	4.3×10^{-23}	338/236	16.08 (10.02,25.81)	1.2×10^{-30}	97/236	1.25 (0.86,1.81)	0.24
+	-	+	17/10	2.67 (1.11,6.43)	0.029	10/10	7.34 (2.47,21.75)	3.3×10^{-4}	7/10	1.44 (0.48,4.3)	0.52
+	+	+	55/26	4.59 (2.62,8.04)	1.0×10^{-7}	42/26	17.96 (8.91,36.17)	6.3×10^{-16}	13/26	1.21 (0.56,2.63)	0.63
Toluene											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	1/2	1.06 (0.09,13)	0.96	1/2	6.05 (0.48,75.71)	0.16	0/2	Not applicable	NA
-	+	-	139/228	1.46 (1.05,2.03)	0.024	60/228	2.90 (1.7,4.93)	8.9×10^{-5}	79/228	1.03 (0.71,1.51)	0.87
-	-	+	263/182	3.20 (2.34,4.38)	2.8×10^{-13}	193/182	10.23 (6.31,16.58)	3.8×10^{-21}	70/182	1.10 (0.74,1.64)	0.63
+	+	-	10/8	2.10 (0.76,5.78)	0.15	4/8	4.74 (1.21,18.66)	0.026	6/8	1.31 (0.41,4.2)	0.66
-	+	+	435/236	4.44 (3.31,5.98)	5.5×10^{-23}	338/236	16.21 (10.08,26.07)	1.4×10^{-30}	97/236	1.22 (0.85,1.77)	0.28
+	-	+	14/6	4.99 (1.78,13.98)	2.3×10^{-3}	11/6	18.93 (6.05,59.26)	4.4×10^{-7}	3/6	1.35 (0.29,6.21)	0.70
+	+	+	28/9	6.99 (3.04,16.07)	4.6×10^{-6}	21/9	29.65 (11.41,77.06)	3.5×10^{-12}	7/9	1.92 (0.64,5.71)	0.24
Welding fume											

-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	2/6	0.79 (0.15,4.09)	0.78	0/6	Not applicable	NA	2/6	0.97 (0.18,5.24)	0.97
-	+	-	139/228	1.48 (1.06,2.05)	0.020	60/228	2.94 (1.73,5.01)	7.1×10^{-5}	79/228	1.05 (0.72,1.53)	0.82
-	-	+	263/182	3.23 (2.37,4.42)	1.7×10^{-13}	193/182	10.43 (6.42,16.93)	2.4×10^{-21}	70/182	1.13 (0.76,1.67)	0.56
+	+	-	11/20	1.26 (0.55,2.86)	0.58	3/20	2.15 (0.56,8.2)	0.26	8/20	0.91 (0.36,2.34)	0.85
-	+	+	435/236	4.47 (3.32,6)	3.3×10^{-23}	338/236	16.40 (10.19,26.4)	1.1×10^{-30}	97/236	1.25 (0.86,1.8)	0.24
+	-	+	19/6	8.26 (3.04,22.48)	3.6×10^{-5}	11/6	23.27 (7.31,74.06)	1.0×10^{-7}	8/6	4.03 (1.23,13.21)	0.021
+	+	+	65/22	7.21 (3.97,13.07)	8.0×10^{-11}	51/22	31.75 (15.13,66.63)	6.1×10^{-20}	14/22	1.55 (0.69,3.47)	0.28
Volatile sulphur compounds											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	12/29	0.88 (0.42,1.87)	0.75	3/29	1.10 (0.3,4.06)	0.89	9/29	0.79 (0.34,1.85)	0.59
-	+	-	139/228	1.43 (1.03,1.98)	0.033	60/228	2.74 (1.62,4.63)	1.7×10^{-4}	79/228	1.02 (0.7,1.49)	0.92
-	-	+	263/182	3.20 (2.34,4.36)	2.5×10^{-13}	193/182	10.09 (6.26,16.27)	2.5×10^{-21}	70/182	1.10 (0.74,1.64)	0.62
+	+	-	24/27	1.72 (0.90,3.27)	0.10	10/27	3.19 (1.29,7.9)	0.012	14/27	1.23 (0.57,2.64)	0.60
-	+	+	435/236	4.35 (3.25,5.84)	1.1×10^{-22}	338/236	15.42 (9.66,24.62)	2.2×10^{-30}	97/236	1.21 (0.83,1.74)	0.32
+	-	+	23/23	1.92 (0.98,3.76)	0.056	10/23	3.40 (1.35,8.56)	9.5×10^{-3}	13/23	1.31 (0.59,2.87)	0.51
+	+	+	82/23	8.09 (4.64,14.11)	1.6×10^{-13}	67/23	34.33 (17.32,68.07)	4.2×10^{-24}	15/23	1.39 (0.64,3.01)	0.40
Other agents in correlation with any of the sixteen independent agents											
Aliphatic and alicyclic hydrocarbon solvents											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	0/6	Not applicable	NA	0/6	Not applicable	NA	0/6	Not applicable	NA
-	+	-	139/228	1.46 (1.05,2.03)	0.025	60/228	2.89 (1.7,4.92)	9.3×10^{-5}	79/228	1.03 (0.71,1.51)	0.86
-	-	+	263/182	3.19 (2.34,4.36)	3.2×10^{-13}	193/182	10.26 (6.32,16.64)	4.1×10^{-21}	70/182	1.11 (0.75,1.65)	0.60
+	+	-	9/7	2.31 (0.80,6.71)	0.12	4/7	4.71 (1.17,19.01)	0.029	5/7	1.27 (0.36,4.46)	0.71
-	+	+	435/236	4.41 (3.28,5.92)	8.2×10^{-23}	338/236	16.18 (10.05,26.03)	1.9×10^{-30}	97/236	1.23 (0.85,1.77)	0.28
+	-	+	14/7	4.26 (1.60,11.35)	3.8×10^{-3}	9/7	12.37 (3.93,38.92)	1.7×10^{-5}	5/7	2.07 (0.59,7.28)	0.26
+	+	+	29/11	5.60 (2.59,12.14)	1.2×10^{-5}	21/11	22.77 (9.19,56.44)	1.5×10^{-11}	8/11	1.84 (0.67,5.08)	0.24
Animal dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	12/24	1.12 (0.52,2.42)	0.76	4/24	1.81 (0.55,5.94)	0.33	8/24	0.90 (0.37,2.19)	0.81
-	+	-	139/228	1.43 (1.03,1.99)	0.031	60/228	2.78 (1.64,4.72)	1.5×10^{-4}	79/228	1.02 (0.7,1.48)	0.94
-	-	+	263/182	3.20 (2.35,4.37)	2.5×10^{-13}	193/182	10.16 (6.28,16.42)	3.1×10^{-21}	70/182	1.11 (0.74,1.64)	0.62
+	+	-	18/24	1.59 (0.79,3.19)	0.20	7/24	3.00 (1.1,8.17)	0.032	11/24	1.12 (0.49,2.56)	0.79
-	+	+	435/236	4.37 (3.26,5.87)	1.0×10^{-22}	338/236	15.65 (9.77,25.06)	2.3×10^{-30}	97/236	1.21 (0.84,1.75)	0.31
+	-	+	19/22	1.84 (0.93,3.66)	0.080	8/22	3.02 (1.15,7.91)	0.024	11/22	1.27 (0.56,2.88)	0.56

+	+	+	58/22	6.34 (3.56,11.27)	3.2×10^{-10}	46/22	24.66 (12.19,49.91)	5.1×10^{-19}	12/22	1.52 (0.67,3.44)	0.31
Aromatic hydrocarbon solvents											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	1/4	0.64 (0.07,6.15)	0.70	1/4	3.79 (0.38,37.52)	0.25	0/4	Not applicable	NA
-	+	-	139/228	1.46 (1.05,2.03)	0.024	60/228	2.90 (1.7,4.94)	8.7×10^{-5}	79/228	1.03 (0.7,1.5)	0.89
-	-	+	263/182	3.19 (2.34,4.36)	3.2×10^{-13}	193/182	10.25 (6.32,16.63)	3.8×10^{-21}	70/182	1.10 (0.74,1.63)	0.63
+	+	-	11/10	1.83 (0.72,4.67)	0.21	4/10	3.68 (0.98,13.81)	0.053	7/10	1.16 (0.39,3.39)	0.79
-	+	+	435/236	4.42 (3.29,5.95)	6.6×10^{-23}	338/236	16.24 (10.1,26.13)	1.4×10^{-30}	97/236	1.22 (0.84,1.76)	0.30
+	-	+	14/6	4.98 (1.78,13.94)	2.2×10^{-3}	11/6	19.00 (6.08,59.41)	4.1×10^{-7}	3/6	1.34 (0.29,6.11)	0.71
+	+	+	33/11	6.40 (2.97,13.8)	2.2×10^{-6}	24/11	26.73 (10.86,65.78)	8.5×10^{-13}	9/11	1.86 (0.69,5.02)	0.22
Benzo(a)pyrene											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/18	1.31 (0.56,3.04)	0.53	5/18	3.64 (1.2,11.09)	0.023	5/18	0.72 (0.25,2.11)	0.55
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.73 (1.62,4.62)	1.8×10^{-4}	79/228	1.03 (0.71,1.5)	0.88
-	-	+	263/182	3.21 (2.36,4.39)	1.8×10^{-13}	193/182	10.18 (6.31,16.42)	1.9×10^{-21}	70/182	1.13 (0.76,1.67)	0.55
+	+	-	47/55	1.96 (1.19,3.22)	8.4×10^{-3}	22/55	4.29 (2.12,8.69)	5.3×10^{-5}	25/55	1.27 (0.69,2.32)	0.44
-	+	+	435/236	4.40 (3.28,5.91)	5.2×10^{-23}	338/236	15.51 (9.72,24.77)	1.6×10^{-30}	97/236	1.25 (0.87,1.8)	0.23
+	-	+	37/26	2.92 (1.60,5.32)	5.0×10^{-4}	27/26	10.48 (4.97,22.09)	6.8×10^{-10}	10/26	0.81 (0.35,1.88)	0.62
+	+	+	132/56	5.04 (3.25,7.82)	5.0×10^{-13}	104/56	19.56 (10.86,35.25)	4.3×10^{-23}	28/56	1.16 (0.64,2.08)	0.63
Chromium											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	0/8	Not applicable	NA	0/8	Not applicable	NA	0/8	Not applicable	NA
-	+	-	139/228	1.46 (1.05,2.02)	0.024	60/228	2.88 (1.7,4.9)	9.0×10^{-5}	79/228	1.03 (0.71,1.51)	0.87
-	-	+	263/182	3.16 (2.31,4.32)	4.4×10^{-13}	193/182	10.16 (6.28,16.45)	3.8×10^{-21}	70/182	1.10 (0.74,1.63)	0.65
+	+	-	11/19	1.53 (0.66,3.51)	0.32	4/19	2.78 (0.82,9.35)	0.10	7/19	1.07 (0.39,2.92)	0.89
-	+	+	435/236	4.39 (3.27,5.9)	9.1×10^{-23}	338/236	16.05 (10,25.77)	1.4×10^{-30}	97/236	1.21 (0.84,1.75)	0.31
+	-	+	9/11	1.65 (0.63,4.31)	0.30	8/11	6.69 (2.28,19.66)	5.4×10^{-4}	1/11	0.18 (0.02,1.48)	0.11
+	+	+	37/9	8.83 (3.97,19.6)	8.8×10^{-8}	29/9	36.29 (14.67,89.73)	7.5×10^{-15}	8/9	1.85 (0.64,5.36)	0.26
Diesel engine exhaust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/27	0.77 (0.35,1.71)	0.52	2/27	0.80 (0.17,3.65)	0.77	8/27	0.72 (0.3,1.72)	0.46
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.74 (1.62,4.64)	1.7×10^{-4}	79/228	1.04 (0.71,1.51)	0.85
-	-	+	263/182	3.16 (2.31,4.31)	3.9×10^{-13}	193/182	9.96 (6.18,16.05)	3.6×10^{-21}	70/182	1.11 (0.75,1.65)	0.59
+	+	-	50/44	2.32 (1.40,3.86)	1.1×10^{-3}	23/44	5.47 (2.68,11.17)	3.1×10^{-6}	27/44	1.43 (0.79,2.59)	0.23

-	+	+	435/236	4.35 (3.24,5.83)	1.0×10^{-22}	338/236	15.39 (9.64,24.56)	2.0×10^{-30}	97/236	1.22 (0.85,1.76)	0.28
+	-	+	41/22	3.95 (2.17,7.19)	7.0×10^{-6}	32/22	15.52 (7.49,32.18)	1.7×10^{-13}	9/22	0.87 (0.36,2.09)	0.76
+	+	+	158/47	7.31 (4.71,11.35)	8.4×10^{-19}	120/47	27.83 (15.41,50.26)	2.8×10^{-28}	38/47	1.93 (1.11,3.34)	0.020
Hardwood dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/19	1.41 (0.60,3.28)	0.43	1/19	0.72 (0.09,5.98)	0.76	9/19	1.43 (0.57,3.56)	0.45
-	+	-	139/228	1.46 (1.05,2.02)	0.024	60/228	2.83 (1.67,4.8)	1.2×10^{-4}	79/228	1.05 (0.72,1.53)	0.81
-	-	+	263/182	3.22 (2.36,4.4)	1.8×10^{-13}	193/182	10.14 (6.27,16.4)	3.8×10^{-21}	70/182	1.14 (0.77,1.69)	0.52
+	+	-	21/30	1.55 (0.81,2.98)	0.19	9/30	3.30 (1.32,8.25)	0.011	12/30	1.01 (0.45,2.22)	0.99
-	+	+	435/236	4.46 (3.32,5.99)	3.1×10^{-23}	338/236	15.87 (9.9,25.45)	1.8×10^{-30}	97/236	1.24 (0.86,1.8)	0.24
+	-	+	26/16	3.65 (1.80,7.39)	3.3×10^{-4}	16/16	11.73 (4.9,28.09)	3.2×10^{-8}	10/16	1.45 (0.59,3.53)	0.42
+	+	+	82/31	6.33 (3.75,10.69)	5.2×10^{-12}	57/31	25.29 (12.82,49.88)	1.1×10^{-20}	25/31	1.87 (0.97,3.6)	0.061
Herbicides											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	6/20	0.70 (0.26,1.87)	0.48	1/20	0.54 (0.07,4.47)	0.57	5/20	0.69 (0.24,2)	0.49
-	+	-	139/228	1.45 (1.04,2.01)	0.027	60/228	2.89 (1.7,4.92)	9.3×10^{-5}	79/228	1.03 (0.7,1.5)	0.89
-	-	+	263/182	3.21 (2.35,4.38)	2.6×10^{-13}	193/182	10.38 (6.4,16.85)	2.7×10^{-21}	70/182	1.10 (0.74,1.64)	0.63
+	+	-	10/16	1.52 (0.62,3.7)	0.36	4/16	2.93 (0.81,10.53)	0.10	6/16	1.04 (0.36,3.03)	0.94
-	+	+	435/236	4.41 (3.28,5.93)	7.4×10^{-23}	338/236	16.24 (10.1,26.14)	1.5×10^{-30}	97/236	1.21 (0.84,1.76)	0.30
+	-	+	8/13	1.45 (0.56,3.75)	0.44	1/13	0.64 (0.07,5.72)	0.69	7/13	1.34 (0.49,3.68)	0.57
+	+	+	30/13	6.50 (3.11,13.58)	6.5×10^{-7}	25/13	29.77 (12.73,69.61)	4.9×10^{-15}	5/13	1.03 (0.3,3.49)	0.96
Insecticides											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	3/4	1.55 (0.31,7.68)	0.59	0/4	Not applicable	NA	3/4	1.83 (0.35,9.46)	0.47
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.82 (1.66,4.78)	1.3×10^{-4}	79/228	1.03 (0.7,1.5)	0.89
-	-	+	263/182	3.19 (2.33,4.35)	3.3×10^{-13}	193/182	10.06 (6.22,16.27)	4.8×10^{-21}	70/182	1.11 (0.74,1.64)	0.62
+	+	-	7/7	2.41 (0.78,7.44)	0.13	2/7	3.86 (0.73,20.48)	0.11	5/7	2.31 (0.65,8.2)	0.20
-	+	+	435/236	4.38 (3.26,5.88)	1.2×10^{-22}	338/236	15.75 (9.82,25.27)	2.7×10^{-30}	97/236	1.22 (0.84,1.76)	0.30
+	-	+	10/6	3.35 (1.11,10.06)	0.031	8/6	12.05 (3.57,40.65)	6.0×10^{-5}	2/6	0.81 (0.15,4.4)	0.81
+	+	+	25/3	18.77 (5.40,65.24)	3.9×10^{-6}	19/3	68.16 (17.93,259.08)	5.8×10^{-10}	6/3	5.68 (1.31,24.64)	0.020
Iron											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	15/28	1.12 (0.55,2.26)	0.76	5/28	1.93 (0.66,5.69)	0.23	10/28	0.92 (0.41,2.06)	0.83
-	+	-	139/228	1.46 (1.05,2.02)	0.024	60/228	2.77 (1.64,4.67)	1.4×10^{-4}	79/228	1.05 (0.72,1.53)	0.81
-	-	+	263/182	3.24 (2.37,4.42)	1.3×10^{-13}	193/182	10.21 (6.33,16.45)	1.4×10^{-21}	70/182	1.15 (0.78,1.7)	0.48

+	+	-	65/73	2.06 (1.31,3.23)	1.8×10^{-3}	26/73	3.88 (1.99,7.56)	6.7×10^{-5}	39/73	1.49 (0.88,2.54)	0.14
-	+	+	435/236	4.45 (3.32,5.97)	2.4×10^{-23}	338/236	15.60 (9.78,24.89)	9.3×10^{-31}	97/236	1.27 (0.88,1.83)	0.20
+	-	+	63/37	3.59 (2.16,5.97)	8.6×10^{-7}	44/37	11.83 (6.14,22.81)	1.6×10^{-13}	19/37	1.22 (0.62,2.4)	0.56
+	+	+	213/73	6.50 (4.35,9.7)	5.9×10^{-20}	169/73	24.99 (14.34,43.56)	7.3×10^{-30}	44/73	1.48 (0.88,2.48)	0.14
Manmade mineral fibres											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	5/8	1.53 (0.46,5.08)	0.48	1/8	1.83 (0.21,16.02)	0.59	4/8	1.14 (0.3,4.29)	0.84
-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.79 (1.65,4.72)	1.4×10^{-4}	79/228	1.02 (0.7,1.49)	0.91
-	-	+	263/182	3.22 (2.36,4.39)	1.7×10^{-13}	193/182	10.01 (6.2,16.14)	3.8×10^{-21}	70/182	1.13 (0.76,1.67)	0.55
+	+	-	21/23	1.90 (0.94,3.84)	0.072	11/23	6.18 (2.48,15.39)	9.1×10^{-5}	10/23	0.90 (0.37,2.17)	0.81
-	+	+	435/236	4.38 (3.26,5.87)	8.3×10^{-23}	338/236	15.50 (9.69,24.79)	2.5×10^{-30}	97/236	1.22 (0.84,1.76)	0.29
+	-	+	21/14	3.29 (1.53,7.09)	2.3×10^{-3}	12/14	10.06 (3.88,26.12)	2.1×10^{-6}	9/14	1.35 (0.52,3.49)	0.53
+	+	+	72/28	6.22 (3.56,10.87)	1.4×10^{-10}	50/28	24.53 (12.02,50.05)	1.4×10^{-18}	22/28	1.82 (0.91,3.67)	0.092
Other organic solvents											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	0/6	Not applicable	NA	0/6	Not applicable	NA	0/6	Not applicable	NA
-	+	-	139/228	1.46 (1.05,2.03)	0.025	60/228	2.89 (1.7,4.92)	9.3×10^{-5}	79/228	1.03 (0.71,1.51)	0.86
-	-	+	263/182	3.19 (2.34,4.36)	3.2×10^{-13}	193/182	10.26 (6.32,16.64)	4.1×10^{-21}	70/182	1.11 (0.75,1.65)	0.60
+	+	-	9/7	2.31 (0.80,6.71)	0.12	4/7	4.71 (1.17,19.01)	0.029	5/7	1.27 (0.36,4.46)	0.71
-	+	+	435/236	4.41 (3.28,5.92)	8.2×10^{-23}	338/236	16.18 (10.05,26.03)	1.9×10^{-30}	97/236	1.23 (0.85,1.77)	0.28
+	-	+	14/7	4.26 (1.60,11.35)	3.8×10^{-3}	9/7	12.37 (3.93,38.92)	1.7×10^{-5}	5/7	2.07 (0.59,7.28)	0.26
+	+	+	29/11	5.60 (2.59,12.14)	1.2×10^{-5}	21/11	22.77 (9.19,56.44)	1.5×10^{-11}	8/11	1.84 (0.67,5.08)	0.24
Plant dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/27	0.83 (0.37,1.85)	0.65	2/27	0.82 (0.17,3.87)	0.80	8/27	0.75 (0.31,1.81)	0.53
-	+	-	139/228	1.43 (1.03,1.98)	0.033	60/228	2.75 (1.63,4.67)	1.6×10^{-4}	79/228	1.02 (0.7,1.49)	0.91
-	-	+	263/182	3.19 (2.34,4.36)	2.6×10^{-13}	193/182	10.06 (6.23,16.23)	3.5×10^{-21}	70/182	1.11 (0.75,1.64)	0.61
+	+	-	22/26	1.78 (0.91,3.48)	0.092	9/26	3.37 (1.32,8.59)	0.011	13/26	1.30 (0.58,2.89)	0.53
-	+	+	435/236	4.37 (3.25,5.86)	1.0×10^{-22}	338/236	15.53 (9.71,24.84)	2.2×10^{-30}	97/236	1.21 (0.84,1.75)	0.31
+	-	+	19/21	1.71 (0.84,3.47)	0.14	7/21	2.45 (0.87,6.84)	0.088	12/21	1.24 (0.55,2.81)	0.60
+	+	+	64/24	6.33 (3.60,11.13)	1.4×10^{-10}	53/24	26.96 (13.52,53.75)	8.2×10^{-21}	11/24	1.09 (0.47,2.54)	0.84
Polycyclic aromatic hydrocarbons											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/24	0.91 (0.40,2.04)	0.82	5/24	2.26 (0.76,6.79)	0.14	5/24	0.53 (0.18,1.5)	0.23

-	+	-	139/228	1.44 (1.04,2)	0.029	60/228	2.72 (1.61,4.6)	1.8×10^{-4}	79/228	1.03 (0.71,1.51)	0.86
-	-	+	263/182	3.20 (2.35,4.37)	2.1×10^{-13}	193/182	10.08 (6.26,16.24)	2.1×10^{-21}	70/182	1.13 (0.76,1.67)	0.54
+	+	-	53/60	2.04 (1.26,3.3)	3.5×10^{-3}	23/60	4.10 (2.05,8.19)	6.4×10^{-5}	30/60	1.43 (0.81,2.53)	0.22
-	+	+	435/236	4.39 (3.27,5.88)	6.1×10^{-23}	338/236	15.41 (9.67,24.58)	1.5×10^{-30}	97/236	1.24 (0.86,1.79)	0.25
+	-	+	42/29	2.95 (1.66,5.23)	2.1×10^{-4}	31/29	10.54 (5.16,21.52)	1.0×10^{-10}	11/29	0.79 (0.35,1.76)	0.56
+	+	+	160/60	5.65 (3.70,8.63)	1.1×10^{-15}	125/60	21.61 (12.18,38.36)	9.0×10^{-26}	35/60	1.32 (0.76,2.3)	0.33
Stone and concrete											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	17/41	0.88 (0.46,1.68)	0.70	4/41	1.02 (0.33,3.18)	0.97	13/41	0.81 (0.39,1.65)	0.56
-	+	-	139/228	1.43 (1.03,1.98)	0.032	60/228	2.69 (1.6,4.53)	2.0×10^{-4}	79/228	1.03 (0.71,1.5)	0.87
-	-	+	263/182	3.18 (2.33,4.33)	2.4×10^{-13}	193/182	9.82 (6.11,15.78)	3.7×10^{-21}	70/182	1.13 (0.77,1.67)	0.54
+	+	-	74/71	2.12 (1.36,3.31)	9.9×10^{-4}	32/71	4.46 (2.33,8.52)	6.1×10^{-6}	42/71	1.41 (0.84,2.37)	0.20
-	+	+	435/236	4.32 (3.23,5.79)	1.0×10^{-22}	338/236	14.97 (9.42,23.81)	2.7×10^{-30}	97/236	1.22 (0.85,1.76)	0.28
+	-	+	68/34	4.00 (2.40,6.65)	9.3×10^{-8}	44/34	12.68 (6.56,24.49)	4.1×10^{-14}	24/34	1.49 (0.79,2.8)	0.22
+	+	+	247/76	7.00 (4.74,10.35)	1.4×10^{-22}	180/76	25.18 (14.53,43.63)	1.3×10^{-30}	67/76	2.13 (1.33,3.41)	1.7×10^{-3}
Wood dust											
-	-	-	101/232	1.00 ref		25/232	1.00 ref		76/232	1.00 ref	
+	-	-	10/19	1.41 (0.60,3.29)	0.43	1/19	0.72 (0.09,5.97)	0.76	9/19	1.43 (0.57,3.55)	0.45
-	+	-	139/228	1.46 (1.05,2.03)	0.024	60/228	2.83 (1.67,4.81)	1.1×10^{-4}	79/228	1.05 (0.72,1.53)	0.81
-	-	+	263/182	3.22 (2.36,4.4)	1.8×10^{-13}	193/182	10.12 (6.25,16.36)	4.0×10^{-21}	70/182	1.14 (0.77,1.69)	0.51
+	+	-	22/30	1.63 (0.86,3.1)	0.14	9/30	3.31 (1.32,8.28)	0.010	13/30	1.11 (0.51,2.41)	0.80
-	+	+	435/236	4.46 (3.32,5.99)	3.1×10^{-23}	338/236	15.85 (9.88,25.41)	1.8×10^{-30}	97/236	1.25 (0.86,1.8)	0.24
+	-	+	27/17	3.53 (1.77,7.05)	3.5×10^{-4}	17/17	11.60 (4.93,27.28)	1.9×10^{-8}	10/17	1.34 (0.55,3.23)	0.52
+	+	+	83/31	6.43 (3.81,10.83)	2.9×10^{-12}	58/31	25.72 (13.08,50.58)	4.8×10^{-21}	25/31	1.87 (0.97,3.61)	0.060

Supplementary Table 6. The combined effects of inhalable agents, smoking, and HLA-SE alleles with risk of RA. Estimates adjusted for age, sex, residential areas, body mass index, levels of education, alcohol drinking, and principal components 1-10. For the OR estimates that were not available due to the limited number of cases within the subgroup, 'not applicable' was marked in corresponding cells.

Occupational exposure	Smoking	HLA-SE	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
			N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
Exposed to any agents											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	210/383	1.01 (0.73,1.4)	0.96	74/383	0.94 (0.58,1.52)	0.79	136/383	1.03 (0.71,1.5)	0.86
-	+	-	145/229	1.35 (0.95,1.92)	0.096	66/229	1.74 (1.06,2.87)	0.030	79/229	1.09 (0.72,1.66)	0.67
-	-	+	239/196	2.46 (1.76,3.45)	1.4×10^{-7}	167/196	5.01 (3.19,7.88)	3.1×10^{-12}	72/196	1.13 (0.74,1.72)	0.58
+	+	-	418/518	1.64 (1.21,2.22)	1.3×10^{-3}	170/518	2.04 (1.32,3.16)	1.3×10^{-3}	248/518	1.41 (0.99,2)	0.055
-	+	+	414/237	3.51 (2.56,4.81)	7.4×10^{-15}	325/237	8.33 (5.4,12.86)	1.0×10^{-21}	89/237	1.09 (0.73,1.65)	0.66
+	-	+	534/420	2.34 (1.73,3.16)	2.8×10^{-8}	364/420	4.68 (3.07,7.13)	8.0×10^{-13}	170/420	1.1 (0.76,1.59)	0.61
+	+	+	1337/598	4.42 (3.32,5.88)	2.1×10^{-24}	1030/598	10.23 (6.79,15.4)	8.6×10^{-29}	307/598	1.51 (1.07,2.12)	0.019
The sixteen independent agents											
Asbestos											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	4/5	2.07 (0.47,9.08)	0.33	2/5	3.5 (0.58,21.22)	0.17	2/5	1.2 (0.2,7.4)	0.84
-	+	-	145/229	1.32 (0.92,1.88)	0.13	66/229	1.76 (1.05,2.92)	0.030	79/229	1.03 (0.68,1.58)	0.88
-	-	+	239/196	2.53 (1.8,3.54)	8.1×10^{-8}	167/196	5.17 (3.27,8.18)	2.2×10^{-12}	72/196	1.13 (0.73,1.74)	0.58
+	+	-	24/29	1.71 (0.84,3.5)	0.14	10/29	2.93 (1.15,7.45)	0.024	14/29	1.02 (0.43,2.43)	0.97
-	+	+	414/237	3.52 (2.55,4.86)	1.7×10^{-14}	325/237	8.61 (5.52,13.43)	2.1×10^{-21}	89/237	1.05 (0.69,1.6)	0.80
+	-	+	17/13	2.82 (1.18,6.72)	0.020	13/13	7.32 (2.71,19.74)	8.4×10^{-5}	4/13	0.84 (0.25,2.9)	0.79
+	+	+	74/18	8.55 (4.4,16.59)	2.3×10^{-10}	53/18	20.09 (9.33,43.24)	1.7×10^{-14}	21/18	2.98 (1.3,6.79)	9.6×10^{-3}
Cadmium											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	2/4	0.71 (0.04,12.52)	0.81	1/4	Not applicable	NA	1/4	1.38 (0.08,25.33)	0.83
-	+	-	145/229	1.31 (0.92,1.88)	0.14	66/229	1.75 (1.05,2.93)	0.032	79/229	1.04 (0.68,1.59)	0.86
-	-	+	239/196	2.55 (1.81,3.58)	7.4×10^{-8}	167/196	5.24 (3.3,8.32)	2.2×10^{-12}	72/196	1.13 (0.73,1.74)	0.59
+	+	-	3/6	0.55 (0.1,3.13)	0.50	2/6	1.73 (0.29,10.29)	0.55	1/6	Not applicable	NA
-	+	+	414/237	3.56 (2.58,4.92)	1.4×10^{-14}	325/237	8.8 (5.62,13.77)	2.0×10^{-21}	89/237	1.07 (0.7,1.63)	0.75

+	-	+	3/5	0.93 (0.21,4.21)	0.93	3/5	2.71 (0.58,12.67)	0.21	0/5	Not applicable	NA
+	+	+	17/7	7.66 (2.37,24.71)	6.6×10^{-4}	13/7	18.14 (5.13,64.07)	6.8×10^{-6}	4/7	2.96 (0.64,13.8)	0.17
Carbon monoxide											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	31/38	1.47 (0.82,2.65)	0.20	10/38	1.46 (0.62,3.48)	0.39	21/38	1.46 (0.74,2.87)	0.27
-	+	-	145/229	1.35 (0.95,1.93)	0.097	66/229	1.78 (1.07,2.96)	0.026	79/229	1.09 (0.72,1.67)	0.68
-	-	+	239/196	2.51 (1.79,3.52)	1.0×10^{-7}	167/196	5.18 (3.28,8.2)	2.1×10^{-12}	72/196	1.13 (0.73,1.74)	0.58
+	+	-	88/102	1.54 (0.99,2.4)	0.057	29/102	1.61 (0.85,3.04)	0.14	59/102	1.42 (0.84,2.39)	0.19
-	+	+	414/237	3.56 (2.59,4.91)	8.0×10^{-15}	325/237	8.64 (5.55,13.46)	1.5×10^{-21}	89/237	1.1 (0.72,1.66)	0.66
+	-	+	67/51	2.31 (1.39,3.81)	1.1×10^{-3}	49/51	5.14 (2.78,9.49)	1.7×10^{-7}	18/51	0.89 (0.44,1.79)	0.73
+	+	+	311/102	5.67 (3.83,8.38)	3.7×10^{-18}	245/102	13.77 (8.3,22.85)	3.5×10^{-24}	66/102	1.68 (1.02,2.76)	0.042
Detergents											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	147/245	1.06 (0.74,1.5)	0.76	54/245	1.01 (0.6,1.71)	0.96	93/245	1.06 (0.71,1.6)	0.77
-	+	-	145/229	1.34 (0.94,1.9)	0.11	66/229	1.68 (1.02,2.76)	0.042	79/229	1.09 (0.72,1.66)	0.68
-	-	+	239/196	2.47 (1.76,3.45)	1.3×10^{-7}	167/196	4.96 (3.16,7.79)	3.7×10^{-12}	72/196	1.14 (0.75,1.75)	0.54
+	+	-	291/345	1.67 (1.22,2.29)	1.5×10^{-3}	115/345	1.99 (1.26,3.13)	2.9×10^{-3}	176/345	1.48 (1.02,2.14)	0.038
-	+	+	414/237	3.48 (2.54,4.78)	1.1×10^{-14}	325/237	8.07 (5.23,12.44)	3.3×10^{-21}	89/237	1.1 (0.73,1.65)	0.65
+	-	+	329/285	2.05 (1.49,2.82)	9.6×10^{-6}	222/285	4.04 (2.61,6.25)	3.8×10^{-10}	107/285	0.96 (0.64,1.43)	0.83
+	+	+	930/387	4.64 (3.45,6.23)	2.2×10^{-24}	718/387	10.56 (6.97,16)	9.2×10^{-29}	212/387	1.62 (1.13,2.32)	8.9×10^{-3}
Flour dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	4/6	1.78 (0.44,7.23)	0.42	0/6	Not applicable	NA	4/6	2.34 (0.56,9.79)	0.24
-	+	-	145/229	1.32 (0.92,1.88)	0.13	66/229	1.76 (1.05,2.93)	0.031	79/229	1.07 (0.7,1.64)	0.76
-	-	+	239/196	2.51 (1.78,3.52)	1.2×10^{-7}	167/196	5.12 (3.23,8.13)	4.1×10^{-12}	72/196	1.14 (0.74,1.75)	0.56
+	+	-	6/4	2.62 (0.68,10.05)	0.16	3/4	4.03 (0.78,20.95)	0.097	3/4	1.96 (0.38,10.04)	0.42
-	+	+	414/237	3.55 (2.57,4.91)	1.3×10^{-14}	325/237	8.69 (5.55,13.59)	3.0×10^{-21}	89/237	1.1 (0.73,1.68)	0.65
+	-	+	9/6	2.93 (0.95,9.04)	0.061	6/6	7.38 (2.05,26.54)	2.2×10^{-3}	3/6	0.81 (0.18,3.63)	0.78
+	+	+	13/6	3.14 (1.06,9.33)	0.040	8/6	7.25 (2.11,24.92)	1.7×10^{-3}	5/6	1.18 (0.25,5.55)	0.84
Fungicides											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	4/7	0.9 (0.2,3.95)	0.88	1/7	Not applicable	NA	3/7	1.36 (0.29,6.28)	0.69
-	+	-	145/229	1.31 (0.91,1.87)	0.14	66/229	1.75 (1.05,2.92)	0.032	79/229	1.04 (0.68,1.59)	0.87

-	-	+	239/196	2.52 (1.79,3.54)	1.0×10^{-7}	167/196	5.16 (3.25,8.18)	3.3×10^{-12}	72/196	1.12 (0.73,1.73)	0.61
+	+	-	7/8	1.09 (0.33,3.65)	0.88	3/8	0.8 (0.09,6.89)	0.84	4/8	1.35 (0.37,5.01)	0.65
-	+	+	414/237	3.53 (2.56,4.88)	1.9×10^{-14}	325/237	8.7 (5.56,13.61)	2.7×10^{-21}	89/237	1.07 (0.7,1.62)	0.77
+	-	+	9/3	5.62 (1.36,23.32)	0.017	8/3	14.25 (3.16,64.26)	5.5×10^{-4}	1/3	0.73 (0.06,8.45)	0.80
+	+	+	24/1	47.9 (6.22,368.86)	2.0×10^{-4}	19/1	133.7 (16.28,1097.75)	5.2×10^{-6}	5/1	23.65 (1.8,310.98)	0.016
Gasoline engine exhaust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	5/9	1.36 (0.4,4.67)	0.63	0/9	Not applicable	NA	5/9	1.64 (0.46,5.89)	0.45
-	+	-	145/229	1.3 (0.91,1.86)	0.15	66/229	1.73 (1.04,2.88)	0.036	79/229	1.04 (0.68,1.58)	0.87
-	-	+	239/196	2.51 (1.79,3.52)	1.1×10^{-7}	167/196	5.14 (3.24,8.15)	3.4×10^{-12}	72/196	1.13 (0.73,1.74)	0.58
+	+	-	20/16	2.77 (1.26,6.06)	0.011	8/16	3.66 (1.31,10.2)	0.013	12/16	2.25 (0.91,5.58)	0.080
-	+	+	414/237	3.5 (2.54,4.83)	2.6×10^{-14}	325/237	8.61 (5.51,13.45)	3.4×10^{-21}	89/237	1.05 (0.69,1.6)	0.81
+	-	+	15/9	2.69 (1.05,6.91)	0.040	10/9	6 (2.09,17.26)	8.8×10^{-4}	5/9	1.14 (0.28,4.67)	0.85
+	+	+	64/19	8.34 (4.21,16.52)	1.2×10^{-9}	50/19	23.7 (10.86,51.73)	1.9×10^{-15}	14/19	2.04 (0.83,4.99)	0.12
Lead											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	7/13	1.04 (0.36,3.03)	0.95	2/13	0.97 (0.20,4.85)	0.97	5/13	0.99 (0.28,3.44)	0.98
-	+	-	145/229	1.28 (0.9,1.83)	0.17	66/229	1.72 (1.03,2.87)	0.037	79/229	1 (0.65,1.53)	10
-	-	+	239/196	2.51 (1.79,3.52)	1.1×10^{-7}	167/196	5.14 (3.24,8.14)	3.5×10^{-12}	72/196	1.13 (0.73,1.74)	0.57
+	+	-	17/43	0.9 (0.44,1.82)	0.77	7/43	1.35 (0.52,3.49)	0.53	10/43	0.69 (0.28,1.69)	0.41
-	+	+	414/237	3.47 (2.51,4.79)	3.6×10^{-14}	325/237	8.56 (5.48,13.38)	4.1×10^{-21}	89/237	1.04 (0.69,1.58)	0.85
+	-	+	20/11	3.54 (1.55,8.12)	2.8×10^{-3}	16/11	9.21 (3.64,23.33)	2.8×10^{-6}	4/11	1.1 (0.32,3.83)	0.88
+	+	+	62/25	4.61 (2.58,8.24)	2.4×10^{-7}	52/25	12.34 (6.22,24.47)	6.3×10^{-13}	10/25	1.11 (0.47,2.61)	0.82
Oil mist											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	2/15	0.22 (0.05,1.09)	0.064	0/15	Not applicable	NA	2/15	0.32 (0.06,1.58)	0.16
-	+	-	145/229	1.3 (0.91,1.86)	0.15	66/229	1.73 (1.04,2.88)	0.035	79/229	1.04 (0.68,1.59)	0.85
-	-	+	239/196	2.49 (1.78,3.5)	1.2×10^{-7}	167/196	5.1 (3.23,8.08)	3.4×10^{-12}	72/196	1.14 (0.74,1.75)	0.56
+	+	-	24/27	1.7 (0.84,3.45)	0.14	8/27	2.49 (0.96,6.43)	0.060	16/27	1.28 (0.54,3.04)	0.58
-	+	+	414/237	3.5 (2.54,4.83)	2.2×10^{-14}	325/237	8.58 (5.5,13.39)	2.5×10^{-21}	89/237	1.07 (0.7,1.62)	0.76
+	-	+	17/12	2.48 (1.03,5.97)	0.043	13/12	6.41 (2.35,17.47)	2.9×10^{-4}	4/12	0.66 (0.18,2.35)	0.52
+	+	+	79/27	5.78 (3.2,10.45)	6.0×10^{-9}	63/27	15.46 (7.72,30.93)	1.0×10^{-14}	16/27	1.44 (0.63,3.29)	0.39

Pulp or paper dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	13/31	0.78 (0.36,1.71)	0.54	5/31	0.87 (0.27,2.8)	0.81	8/31	0.66 (0.26,1.66)	0.38
-	+	-	145/229	1.31 (0.92,1.88)	0.13	66/229	1.79 (1.07,2.98)	0.026	79/229	1.04 (0.68,1.58)	0.86
-	-	+	239/196	2.49 (1.78,3.5)	1.3×10^{-7}	167/196	5.2 (3.28,8.25)	2.5×10^{-12}	72/196	1.13 (0.73,1.73)	0.59
+	+	-	27/38	2.04 (1.09,3.81)	0.026	19/38	4.34 (2.06,9.15)	1.1×10^{-4}	8/38	1.06 (0.43,2.6)	0.90
-	+	+	414/237	3.53 (2.56,4.87)	1.6×10^{-14}	325/237	8.84 (5.65,13.82)	1.2×10^{-21}	89/237	1.07 (0.7,1.61)	0.76
+	-	+	52/26	3.01 (1.66,5.45)	2.7×10^{-4}	38/26	6.83 (3.37,13.85)	9.8×10^{-8}	14/26	1.13 (0.5,2.53)	0.77
+	+	+	118/48	4.32 (2.74,6.8)	2.6×10^{-10}	90/48	10.7 (6.09,18.8)	1.7×10^{-16}	28/48	1.45 (0.79,2.64)	0.23
Quartz dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	9/10	1.91 (0.68,5.39)	0.22	1/10	0.69 (0.08,5.92)	0.73	8/10	2.6 (0.84,8.05)	0.097
-	+	-	145/229	1.3 (0.91,1.85)	0.15	66/229	1.73 (1.04,2.87)	0.035	79/229	1.03 (0.67,1.57)	0.89
-	-	+	239/196	2.51 (1.79,3.52)	9.3×10^{-8}	167/196	5.1 (3.23,8.06)	3.0×10^{-12}	72/196	1.11 (0.72,1.71)	0.63
+	+	-	40/37	2.06 (1.11,3.81)	0.022	17/37	2.98 (1.32,6.72)	8.7×10^{-3}	23/37	1.51 (0.72,3.15)	0.27
-	+	+	414/237	3.5 (2.54,4.82)	1.9×10^{-14}	325/237	8.47 (5.44,13.19)	3.0×10^{-21}	89/237	1.05 (0.69,1.59)	0.82
+	-	+	28/18	3.37 (1.6,7.13)	1.4×10^{-3}	21/18	7.88 (3.31,18.75)	3.0×10^{-6}	7/18	1.12 (0.4,3.12)	0.83
+	+	+	121/38	6.88 (4.04,11.73)	1.3×10^{-12}	91/38	17.35 (9.13,32.94)	2.8×10^{-18}	30/38	1.98 (0.98,4.01)	0.058
Softwood dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	11/17	1.35 (0.55,3.29)	0.51	2/17	0.36 (0.04,3.16)	0.36	9/17	1.76 (0.67,4.59)	0.25
-	+	-	145/229	1.32 (0.92,1.88)	0.13	66/229	1.78 (1.07,2.96)	0.027	79/229	1.05 (0.69,1.61)	0.82
-	-	+	239/196	2.49 (1.78,3.5)	1.2×10^{-7}	167/196	5.16 (3.26,8.17)	2.9×10^{-12}	72/196	1.11 (0.72,1.71)	0.63
+	+	-	28/27	1.89 (0.97,3.67)	0.060	11/27	2.75 (1.15,6.57)	0.023	17/27	1.36 (0.61,3.01)	0.45
-	+	+	414/237	3.53 (2.56,4.87)	1.4×10^{-14}	325/237	8.74 (5.6,13.65)	1.6×10^{-21}	89/237	1.06 (0.7,1.61)	0.79
+	-	+	23/16	2.82 (1.29,6.2)	9.7×10^{-3}	15/16	6.37 (2.53,16.05)	8.5×10^{-5}	8/16	1.23 (0.43,3.46)	0.70
+	+	+	73/32	4.52 (2.6,7.85)	9.0×10^{-8}	53/32	11.78 (6,23.12)	7.4×10^{-13}	20/32	1.59 (0.77,3.28)	0.21
Textile dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	13/18	0.81 (0.33,1.98)	0.64	2/18	0.28 (0.04,2.11)	0.21	11/18	1.08 (0.41,2.85)	0.87
-	+	-	145/229	1.33 (0.93,1.91)	0.12	66/229	1.78 (1.06,2.97)	0.028	79/229	1.06 (0.69,1.63)	0.79
-	-	+	239/196	2.55 (1.81,3.59)	7.4×10^{-8}	167/196	5.32 (3.34,8.46)	1.7×10^{-12}	72/196	1.13 (0.73,1.74)	0.59

+	+	-	20/21	1.47 (0.69,3.1)	0.31	7/21	1.87 (0.65,5.33)	0.24	13/21	1.21 (0.5,2.92)	0.67
-	+	+	414/237	3.63 (2.63,5.02)	5.9×10^{-15}	325/237	9.01 (5.75,14.12)	9.3×10^{-22}	89/237	1.1 (0.73,1.68)	0.64
+	-	+	16/11	1.74 (0.69,4.41)	0.24	10/11	3.72 (1.24,11.18)	0.019	6/11	0.9 (0.27,3.05)	0.87
+	+	+	60/37	3.17 (1.84,5.47)	3.3×10^{-5}	48/37	8.62 (4.51,16.47)	7.5×10^{-11}	12/37	0.82 (0.36,1.87)	0.64
Toluene											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	2/3	1.16 (0.1,13.72)	0.91	2/3	3.54 (0.29,43.65)	0.32	0/3	Not applicable	NA
-	+	-	145/229	1.33 (0.93,1.9)	0.12	66/229	1.78 (1.06,2.96)	0.028	79/229	1.04 (0.68,1.6)	0.85
-	-	+	239/196	2.55 (1.82,3.59)	7.0×10^{-8}	167/196	5.22 (3.29,8.28)	2.4×10^{-12}	72/196	1.13 (0.74,1.75)	0.57
+	+	-	15/5	3.89 (1.3,11.66)	0.015	7/5	6.98 (1.9,25.65)	3.5×10^{-3}	8/5	2.77 (0.79,9.75)	0.11
-	+	+	414/237	3.59 (2.6,4.96)	9.5×10^{-15}	325/237	8.86 (5.66,13.86)	1.4×10^{-21}	89/237	1.07 (0.71,1.63)	0.74
+	-	+	11/6	2.61 (0.83,8.23)	0.10	8/6	6.03 (1.71,21.28)	5.2×10^{-3}	3/6	0.95 (0.16,5.72)	0.96
+	+	+	29/9	5.37 (2.25,12.84)	1.6×10^{-4}	21/9	13.73 (5.17,36.47)	1.5×10^{-7}	8/9	1.75 (0.54,5.69)	0.35
Welding fume											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	5/5	2.12 (0.57,7.85)	0.26	1/5	1.47 (0.16,13.42)	0.73	4/5	2.15 (0.51,9.05)	0.29
-	+	-	145/229	1.34 (0.93,1.91)	0.11	66/229	1.81 (1.08,3.02)	0.023	79/229	1.06 (0.69,1.62)	0.79
-	-	+	239/196	2.52 (1.8,3.55)	9.2×10^{-8}	167/196	5.23 (3.29,8.29)	2.3×10^{-12}	72/196	1.14 (0.74,1.76)	0.55
+	+	-	17/24	1.33 (0.61,2.94)	0.47	5/24	1.32 (0.39,4.45)	0.66	12/24	1.15 (0.46,2.84)	0.77
-	+	+	414/237	3.58 (2.59,4.94)	9.2×10^{-15}	325/237	8.87 (5.67,13.88)	1.2×10^{-21}	89/237	1.09 (0.72,1.66)	0.68
+	-	+	13/7	4.08 (1.41,11.85)	9.7×10^{-3}	9/7	8.98 (2.7,29.85)	3.4×10^{-4}	4/7	1.87 (0.47,7.41)	0.37
+	+	+	60/18	6.32 (3.27,12.23)	4.2×10^{-8}	49/18	18.02 (8.42,38.55)	9.3×10^{-14}	11/18	1.2 (0.45,3.21)	0.72
Volatile sulphur compounds											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	14/23	0.96 (0.43,2.15)	0.92	4/23	0.83 (0.22,3.14)	0.78	10/23	0.96 (0.39,2.38)	0.94
-	+	-	145/229	1.31 (0.92,1.87)	0.14	66/229	1.73 (1.04,2.89)	0.035	79/229	1.04 (0.68,1.59)	0.85
-	-	+	239/196	2.52 (1.8,3.54)	9.1×10^{-8}	167/196	5.23 (3.3,8.3)	2.1×10^{-12}	72/196	1.11 (0.72,1.71)	0.64
+	+	-	24/29	1.05 (0.52,2.12)	0.88	9/29	0.97 (0.34,2.78)	0.96	15/29	0.93 (0.41,2.11)	0.87
-	+	+	414/237	3.52 (2.55,4.86)	1.8×10^{-14}	325/237	8.76 (5.6,13.69)	1.7×10^{-21}	89/237	1.05 (0.69,1.59)	0.82
+	-	+	24/24	1.54 (0.75,3.13)	0.24	14/24	2.15 (0.85,5.42)	0.11	10/24	1.08 (0.45,2.61)	0.86
+	+	+	94/18	9.22 (4.98,17.07)	1.5×10^{-12}	74/18	25.89 (12.71,52.74)	3.1×10^{-19}	20/18	2.24 (0.98,5.09)	0.055
Other agents in correlation with any of the sixteen independent partciles											
Wood dust											

-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	11/17	1.35 (0.55,3.29)	0.51	2/17	0.36 (0.04,3.16)	0.36	9/17	1.76 (0.67,4.59)	0.25
-	+	-	145/229	1.32 (0.92,1.88)	0.13	66/229	1.78 (1.07,2.96)	0.027	79/229	1.05 (0.69,1.61)	0.82
-	-	+	239/196	2.49 (1.78,3.5)	1.2×10^{-7}	167/196	5.16 (3.26,8.17)	2.9×10^{-12}	72/196	1.11 (0.72,1.71)	0.63
+	+	-	28/27	1.89 (0.97,3.67)	0.060	11/27	2.75 (1.15,6.57)	0.023	17/27	1.36 (0.61,3.01)	0.45
-	+	+	414/237	3.53 (2.56,4.87)	1.4×10^{-14}	325/237	8.74 (5.6,13.65)	1.6×10^{-21}	89/237	1.06 (0.7,1.61)	0.79
+	-	+	23/16	2.82 (1.29,6.2)	9.7×10^{-3}	15/16	6.37 (2.53,16.05)	8.5×10^{-5}	8/16	1.23 (0.43,3.46)	0.70
+	+	+	73/32	4.52 (2.6,7.85)	9.0×10^{-8}	53/32	11.78 (6,23.12)	7.4×10^{-13}	20/32	1.59 (0.77,3.28)	0.21
Aliphatic and alicyclic hydrocarbon solvents											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	3/3	1.34 (0.21,8.42)	0.76	2/3	2.13 (0.2,22.19)	0.53	1/3	0.75 (0.07,7.53)	0.80
-	+	-	145/229	1.32 (0.92,1.9)	0.12	66/229	1.79 (1.07,2.99)	0.026	79/229	1.05 (0.68,1.6)	0.84
-	-	+	239/196	2.53 (1.8,3.56)	9.0×10^{-8}	167/196	5.26 (3.31,8.36)	2.2×10^{-12}	72/196	1.13 (0.73,1.73)	0.59
+	+	-	11/7	2.14 (0.75,6.16)	0.16	5/7	3.26 (0.89,11.93)	0.074	6/7	1.4 (0.39,5.03)	0.61
-	+	+	414/237	3.58 (2.59,4.95)	1.1×10^{-14}	325/237	8.95 (5.71,14.04)	1.3×10^{-21}	89/237	1.08 (0.71,1.64)	0.73
+	-	+	9/8	1.84 (0.6,5.58)	0.28	6/8	3.15 (0.82,12.12)	0.096	3/8	1.2 (0.27,5.27)	0.81
+	+	+	34/11	5.77 (2.47,13.47)	5.0×10^{-5}	24/11	14.05 (5.38,36.69)	6.7×10^{-8}	10/11	2.38 (0.8,7.03)	0.12
Animal dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	11/22	0.81 (0.34,1.92)	0.63	3/22	0.54 (0.11,2.59)	0.44	8/22	0.81 (0.31,2.14)	0.67
-	+	-	145/229	1.31 (0.91,1.87)	0.14	66/229	1.74 (1.04,2.9)	0.034	79/229	1.03 (0.67,1.58)	0.89
-	-	+	239/196	2.53 (1.8,3.55)	8.6×10^{-8}	167/196	5.21 (3.29,8.27)	2.3×10^{-12}	72/196	1.11 (0.72,1.71)	0.64
+	+	-	20/20	1.24 (0.57,2.71)	0.59	7/20	1.35 (0.44,4.17)	0.60	13/20	1.03 (0.41,2.59)	0.95
-	+	+	414/237	3.52 (2.55,4.86)	1.8×10^{-14}	325/237	8.72 (5.57,13.63)	2.3×10^{-21}	89/237	1.05 (0.69,1.59)	0.82
+	-	+	22/23	1.58 (0.76,3.29)	0.22	12/23	2.06 (0.79,5.37)	0.14	10/23	1.22 (0.5,2.99)	0.66
+	+	+	65/23	6.19 (3.35,11.44)	6.2×10^{-9}	51/23	15.79 (7.77,32.1)	2.5×10^{-14}	14/23	1.78 (0.76,4.19)	0.19
Aromatic hydrocarbon solvents											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	2/3	1.15 (0.1,13.64)	0.91	2/3	3.5 (0.28,43.1)	0.33	0/3	Not applicable	NA
-	+	-	145/229	1.33 (0.93,1.9)	0.12	66/229	1.78 (1.07,2.97)	0.027	79/229	1.04 (0.68,1.6)	0.85
-	-	+	239/196	2.54 (1.81,3.58)	7.7×10^{-8}	167/196	5.23 (3.29,8.3)	2.3×10^{-12}	72/196	1.13 (0.74,1.75)	0.57
+	+	-	16/8	2.57 (1,6.59)	0.050	8/8	4.82 (1.54,15.06)	6.8×10^{-3}	8/8	1.6 (0.52,4.93)	0.42
-	+	+	414/237	3.58 (2.59,4.95)	1.0×10^{-14}	325/237	8.88 (5.68,13.91)	1.3×10^{-21}	89/237	1.07 (0.7,1.62)	0.75

+	-	+	11/7	2.33 (0.77,6.99)	0.13	8/7	5.45 (1.61,18.4)	6.4×10^{-3}	3/7	0.85 (0.15,4.86)	0.86
+	+	+	35/11	5.67 (2.48,12.97)	3.9×10^{-5}	24/11	13.53 (5.28,34.72)	6.0×10^{-8}	11/11	2.26 (0.78,6.51)	0.13
Benzo(a)pyrene											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	14/19	1.26 (0.56,2.83)	0.57	7/19	1.83 (0.63,5.36)	0.27	7/19	0.9 (0.33,2.45)	0.84
-	+	-	145/229	1.32 (0.93,1.89)	0.12	66/229	1.75 (1.05,2.91)	0.032	79/229	1.06 (0.69,1.61)	0.80
-	-	+	239/196	2.5 (1.78,3.51)	1.1×10^{-7}	167/196	5.16 (3.26,8.17)	2.6×10^{-12}	72/196	1.12 (0.73,1.73)	0.60
+	+	-	44/49	1.46 (0.83,2.57)	0.19	13/49	1.62 (0.72,3.61)	0.24	31/49	1.26 (0.64,2.46)	0.51
-	+	+	414/237	3.51 (2.55,4.84)	1.7×10^{-14}	325/237	8.5 (5.45,13.25)	3.3×10^{-21}	89/237	1.07 (0.7,1.62)	0.76
+	-	+	27/22	2.69 (1.33,5.43)	5.8×10^{-3}	22/22	6.98 (3.12,15.63)	2.3×10^{-6}	5/22	0.58 (0.19,1.76)	0.34
+	+	+	144/56	4.49 (2.83,7.13)	1.8×10^{-10}	112/56	10.86 (6.14,19.19)	2.3×10^{-16}	32/56	1.33 (0.71,2.46)	0.37
Chromium											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	0/12	Not applicable	NA	0/12	Not applicable	NA	0/12	Not applicable	NA
-	+	-	145/229	1.32 (0.92,1.89)	0.13	66/229	1.77 (1.06,2.96)	0.028	79/229	1.05 (0.68,1.6)	0.84
-	-	+	239/196	2.5 (1.78,3.51)	1.3×10^{-7}	167/196	5.15 (3.24,8.16)	3.4×10^{-12}	72/196	1.12 (0.73,1.73)	0.60
+	+	-	13/17	1.58 (0.65,3.84)	0.31	5/17	2.69 (0.85,8.54)	0.094	8/17	1.03 (0.34,3.13)	0.96
-	+	+	414/237	3.57 (2.58,4.93)	1.2×10^{-14}	325/237	8.83 (5.64,13.81)	1.4×10^{-21}	89/237	1.08 (0.71,1.64)	0.73
+	-	+	10/6	3.61 (1.11,11.8)	0.033	9/6	10.12 (2.8,36.49)	4.1×10^{-4}	1/6	0.41 (0.04,3.78)	0.43
+	+	+	39/10	6.43 (2.91,14.22)	4.4×10^{-6}	29/10	16.56 (6.89,39.76)	3.4×10^{-10}	10/10	1.93 (0.63,5.9)	0.25
Diesel engine exhaust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	9/23	0.77 (0.31,1.92)	0.57	1/23	0.33 (0.04,2.6)	0.29	8/23	0.88 (0.33,2.36)	0.80
-	+	-	145/229	1.32 (0.93,1.89)	0.12	66/229	1.75 (1.05,2.92)	0.031	79/229	1.07 (0.7,1.63)	0.75
-	-	+	239/196	2.49 (1.77,3.49)	1.3×10^{-7}	167/196	5.17 (3.26,8.18)	2.6×10^{-12}	72/196	1.12 (0.73,1.72)	0.59
+	+	-	50/45	2.21 (1.27,3.84)	4.8×10^{-3}	20/45	2.86 (1.35,6.03)	5.8×10^{-3}	30/45	1.69 (0.89,3.2)	0.11
-	+	+	414/237	3.51 (2.54,4.84)	1.9×10^{-14}	325/237	8.65 (5.54,13.5)	2.2×10^{-21}	89/237	1.06 (0.7,1.61)	0.77
+	-	+	38/28	2.32 (1.26,4.24)	6.6×10^{-3}	29/28	6.07 (2.99,12.33)	5.9×10^{-7}	9/28	0.63 (0.24,1.61)	0.33
+	+	+	155/46	6.44 (3.98,10.43)	3.7×10^{-14}	120/46	16.44 (9.09,29.72)	2.0×10^{-20}	35/46	1.95 (1.05,3.6)	0.034
Hardwood dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	11/17	1.34 (0.55,3.27)	0.52	2/17	0.36 (0.04,3.13)	0.35	9/17	1.76 (0.67,4.59)	0.25

-	+	-	145/229	1.32 (0.92,1.88)	0.13	66/229	1.78 (1.07,2.96)	0.027	79/229	1.05 (0.69,1.61)	0.82
-	-	+	239/196	2.49 (1.78,3.5)	1.2×10^{-7}	167/196	5.16 (3.26,8.18)	2.9×10^{-12}	72/196	1.11 (0.72,1.71)	0.63
+	+	-	28/27	1.88 (0.97,3.65)	0.063	11/27	2.73 (1.14,6.51)	0.024	17/27	1.36 (0.61,3.01)	0.45
-	+	+	414/237	3.53 (2.56,4.87)	1.4×10^{-14}	325/237	8.73 (5.59,13.64)	1.7×10^{-21}	89/237	1.06 (0.7,1.61)	0.79
+	-	+	23/16	2.81 (1.28,6.17)	0.010	15/16	6.31 (2.51,15.91)	9.3×10^{-5}	8/16	1.23 (0.43,3.46)	0.70
+	+	+	72/32	4.42 (2.54,7.71)	1.5×10^{-7}	52/32	11.43 (5.8,22.52)	1.9×10^{-12}	20/32	1.59 (0.77,3.28)	0.21
Herbicides											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	9/18	0.8 (0.3,2.11)	0.65	2/18	0.36 (0.04,3.08)	0.35	7/18	0.83 (0.29,2.38)	0.72
-	+	-	145/229	1.32 (0.92,1.89)	0.13	66/229	1.8 (1.07,3)	0.025	79/229	1.03 (0.68,1.58)	0.88
-	-	+	239/196	2.52 (1.79,3.54)	1.0×10^{-7}	167/196	5.25 (3.3,8.34)	2.3×10^{-12}	72/196	1.1 (0.71,1.7)	0.66
+	+	-	9/13	0.85 (0.29,2.52)	0.77	4/13	0.85 (0.16,4.54)	0.85	5/13	0.73 (0.21,2.57)	0.62
-	+	+	414/237	3.54 (2.57,4.89)	1.5×10^{-14}	325/237	8.91 (5.69,13.96)	1.3×10^{-21}	89/237	1.06 (0.7,1.6)	0.80
+	-	+	10/14	1.02 (0.35,2.96)	0.97	4/14	0.43 (0.05,3.68)	0.44	6/14	1.11 (0.35,3.51)	0.86
+	+	+	37/14	5.8 (2.78,12.1)	2.9×10^{-6}	29/14	16.56 (7.2,38.11)	4.1×10^{-11}	8/14	1.46 (0.5,4.3)	0.49
Insecticides											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	4/7	0.9 (0.2,3.95)	0.88	1/7	Not applicable	NA	3/7	1.36 (0.29,6.28)	0.69
-	+	-	145/229	1.31 (0.91,1.87)	0.14	66/229	1.75 (1.05,2.92)	0.032	79/229	1.04 (0.68,1.59)	0.87
-	-	+	239/196	2.52 (1.79,3.54)	1.0×10^{-7}	167/196	5.16 (3.25,8.18)	3.3×10^{-12}	72/196	1.12 (0.73,1.73)	0.61
+	+	-	7/8	1.09 (0.33,3.65)	0.88	3/8	0.8 (0.09,6.89)	0.84	4/8	1.35 (0.37,5.01)	0.65
-	+	+	414/237	3.53 (2.56,4.88)	1.9×10^{-14}	325/237	8.7 (5.56,13.61)	2.7×10^{-21}	89/237	1.07 (0.7,1.62)	0.77
+	-	+	9/3	5.62 (1.36,23.32)	0.017	8/3	14.25 (3.16,64.26)	5.5×10^{-4}	1/3	0.73 (0.06,8.45)	0.80
+	+	+	24/1	47.9 (6.22,368.86)	2.0×10^{-4}	19/1	133.7 (16.28,1097.75)	5.2×10^{-6}	5/1	23.65 (1.8,310.98)	0.016
Iron											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	22/26	1.53 (0.77,3.03)	0.22	8/26	1.52 (0.56,4.1)	0.41	14/26	1.46 (0.67,3.2)	0.35
-	+	-	145/229	1.34 (0.94,1.91)	0.11	66/229	1.75 (1.06,2.91)	0.030	79/229	1.08 (0.71,1.65)	0.72
-	-	+	239/196	2.51 (1.79,3.52)	9.5×10^{-8}	167/196	5.14 (3.25,8.11)	2.3×10^{-12}	72/196	1.16 (0.76,1.79)	0.49
+	+	-	64/70	1.62 (0.98,2.67)	0.059	20/70	1.78 (0.88,3.61)	0.11	44/70	1.41 (0.78,2.56)	0.25
-	+	+	414/237	3.55 (2.57,4.88)	9.7×10^{-15}	325/237	8.52 (5.48,13.25)	1.8×10^{-21}	89/237	1.1 (0.72,1.66)	0.66
+	-	+	48/33	2.89 (1.62,5.16)	3.4×10^{-4}	38/33	6.88 (3.48,13.6)	3.0×10^{-8}	10/33	0.83 (0.35,1.93)	0.66

+	+	+	223/69	5.78 (3.76,8.87)	1.2×10^{-15}	173/69	13.79 (8.05,23.62)	1.2×10^{-21}	50/69	1.68 (0.96,2.93)	0.067
Manmade mineral fibres											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	4/6	1.58 (0.38,6.56)	0.53	0/6	Not applicable	NA	4/6	2.04 (0.46,8.98)	0.35
-	+	-	145/229	1.31 (0.92,1.87)	0.14	66/229	1.75 (1.05,2.9)	0.032	79/229	1.04 (0.68,1.59)	0.86
-	-	+	239/196	2.52 (1.79,3.53)	9.1×10^{-8}	167/196	5.12 (3.24,8.1)	2.8×10^{-12}	72/196	1.12 (0.73,1.73)	0.60
+	+	-	27/24	1.96 (0.96,4)	0.064	13/24	3.64 (1.48,8.95)	4.9×10^{-3}	14/24	1.18 (0.49,2.86)	0.71
-	+	+	414/237	3.52 (2.55,4.85)	1.7×10^{-14}	325/237	8.55 (5.49,13.33)	2.6×10^{-21}	89/237	1.06 (0.7,1.61)	0.78
+	-	+	18/15	2.58 (1.11,5.99)	0.028	13/15	6.21 (2.34,16.44)	2.4×10^{-4}	5/15	0.87 (0.27,2.81)	0.82
+	+	+	66/26	5.2 (2.81,9.62)	1.4×10^{-7}	48/26	13.29 (6.41,27.57)	3.6×10^{-12}	18/26	1.64 (0.73,3.69)	0.24
Other organic solvents											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	3/3	1.34 (0.21,8.42)	0.76	2/3	2.13 (0.2,22.19)	0.53	1/3	0.75 (0.07,7.53)	0.80
-	+	-	145/229	1.32 (0.92,1.9)	0.12	66/229	1.79 (1.07,2.99)	0.026	79/229	1.05 (0.68,1.6)	0.84
-	-	+	239/196	2.53 (1.8,3.56)	9.0×10^{-8}	167/196	5.26 (3.31,8.36)	2.2×10^{-12}	72/196	1.13 (0.73,1.73)	0.59
+	+	-	11/7	2.14 (0.75,6.16)	0.16	5/7	3.26 (0.89,11.93)	0.074	6/7	1.4 (0.39,5.03)	0.61
-	+	+	414/237	3.58 (2.59,4.95)	1.1×10^{-14}	325/237	8.95 (5.71,14.04)	1.3×10^{-21}	89/237	1.08 (0.71,1.64)	0.73
+	-	+	9/8	1.84 (0.6,5.58)	0.28	6/8	3.15 (0.82,12.12)	0.096	3/8	1.2 (0.27,5.27)	0.81
+	+	+	34/11	5.77 (2.47,13.47)	5.0×10^{-5}	24/11	14.05 (5.38,36.69)	6.7×10^{-8}	10/11	2.38 (0.8,7.03)	0.12
Plant dust											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	12/22	0.89 (0.38,2.08)	0.79	3/22	0.59 (0.12,2.85)	0.51	9/22	0.87 (0.34,2.23)	0.78
-	+	-	145/229	1.31 (0.92,1.88)	0.14	66/229	1.75 (1.05,2.92)	0.032	79/229	1.04 (0.68,1.59)	0.86
-	-	+	239/196	2.53 (1.8,3.55)	9.0×10^{-8}	167/196	5.25 (3.31,8.34)	2.1×10^{-12}	72/196	1.1 (0.72,1.7)	0.66
+	+	-	20/27	1.03 (0.5,2.14)	0.94	7/27	0.93 (0.31,2.8)	0.90	13/27	0.96 (0.41,2.24)	0.92
-	+	+	414/237	3.54 (2.56,4.88)	1.6×10^{-14}	325/237	8.85 (5.65,13.85)	1.5×10^{-21}	89/237	1.05 (0.69,1.6)	0.81
+	-	+	20/23	1.24 (0.58,2.63)	0.58	10/23	1.48 (0.53,4.11)	0.45	10/23	0.97 (0.39,2.41)	0.95
+	+	+	73/21	7.11 (3.84,13.18)	4.7×10^{-10}	59/21	20.4 (9.99,41.69)	1.3×10^{-16}	14/21	1.73 (0.72,4.17)	0.22
Polycyclic aromatic hydrocarbons											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	14/25	0.96 (0.44,2.1)	0.93	7/25	1.34 (0.47,3.83)	0.59	7/25	0.7 (0.27,1.85)	0.47
-	+	-	145/229	1.32 (0.93,1.89)	0.12	66/229	1.73 (1.04,2.86)	0.035	79/229	1.06 (0.69,1.62)	0.79
-	-	+	239/196	2.49 (1.78,3.49)	1.2×10^{-7}	167/196	5.08 (3.22,8.03)	3.1×10^{-12}	72/196	1.14 (0.74,1.75)	0.56

+	+	-	50/53	1.56 (0.91,2.67)	0.11	14/53	1.63 (0.75,3.55)	0.21	36/53	1.39 (0.73,2.64)	0.31
-	+	+	414/237	3.5 (2.54,4.83)	1.7×10^{-14}	325/237	8.41 (5.41,13.06)	3.0×10^{-21}	89/237	1.07 (0.71,1.62)	0.75
+	-	+	32/26	2.58 (1.33,4.99)	5.0×10^{-3}	26/26	6.43 (3,13.79)	1.7×10^{-6}	6/26	0.58 (0.21,1.62)	0.30
+	+	+	173/59	5.09 (3.25,7.97)	1.1×10^{-12}	134/59	12.27 (7.04,21.36)	8.2×10^{-19}	39/59	1.49 (0.83,2.69)	0.18
Stone and concrete											
-	-	-	106/185	1.00 ref		36/185	1.00 ref		70/185	1.00 ref	
+	-	-	17/32	1.02 (0.5,2.11)	0.95	2/32	0.44 (0.1,1.99)	0.29	15/32	1.29 (0.59,2.82)	0.52
-	+	-	145/229	1.31 (0.92,1.87)	0.14	66/229	1.72 (1.04,2.86)	0.036	79/229	1.06 (0.69,1.61)	0.80
-	-	+	239/196	2.49 (1.78,3.49)	1.2×10^{-7}	167/196	5.12 (3.24,8.09)	2.7×10^{-12}	72/196	1.11 (0.72,1.7)	0.63
+	+	-	74/77	1.83 (1.13,2.96)	0.014	30/77	2.38 (1.23,4.62)	0.010	44/77	1.4 (0.8,2.46)	0.24
-	+	+	414/237	3.49 (2.53,4.81)	2.0×10^{-14}	325/237	8.48 (5.45,13.2)	2.8×10^{-21}	89/237	1.06 (0.7,1.6)	0.79
+	-	+	57/42	2.4 (1.41,4.08)	1.3×10^{-3}	41/42	5.45 (2.85,10.42)	3.0×10^{-7}	16/42	0.88 (0.42,1.81)	0.72
+	+	+	239/74	6.25 (4.07,9.6)	5.9×10^{-17}	178/74	14.97 (8.69,25.79)	1.9×10^{-22}	61/74	2.12 (1.24,3.64)	6.1×10^{-3}

Supplementary Table 7. Additive interaction effects between occupational inhalable agents and genetic risk score on the development of RA. Estimates were adjusted for age, sex, residential area, smoking, alcohol drinking, levels of education, body mass index and principal components 1-10. For the OR estimates that were not available due to limited number of cases within the subgroup, 'not applicable' was marked in corresponding cells.

		Overall RA			ACPA-positive subtype			ACPA-negative subtype		
Occupational exposure	**GRS**	**N (case / control)**	**OR (95%CI)**	**P**	**N (case / control)**	**OR (95%CI)**	**P**	**N (case / control)**	**OR (95%CI)**	**P**
Exposed to any agents										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	577/962	1.08 (0.89, 1.31)	0.43	237/962	1.31 (0.99, 1.74)	0.059	340/962	1.00 (0.79,1.25)	0.99
-	+	698/418	3.09 (2.52, 3.79)	2.0×10^{-27}	531/418	6.97 (5.29, 9.17)	1.5×10^{-43}	167/418	1.17 (0.90,1.53)	0.23
+	+	1921/998	3.43 (2.86, 4.11)	4.8×10^{-40}	1418/998	7.44 (5.75, 9.62)	7.0×10^{-53}	503/998	1.42 (1.14,1.77)	1.7×10^{-3}
			0.07 (-0.07,0.22), p=0.33			0.02 (-0.14,0.18), p=0.79			-0.21 (-0.54,0.11), p=0.2	
					The sixteen independent agents					
Asbestos										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	24/33	1.25 (0.68, 2.27)	0.47	11/33	2.05 (0.94, 4.49)	0.073	13/33	0.86 (0.41,1.81)	0.70
-	+	698/418	3.09 (2.52, 3.80)	7.7×10^{-27}	531/418	6.96 (5.27, 9.20)	2.4×10^{-42}	167/418	1.14 (0.87,1.49)	0.33
+	+	91/29	5.85 (3.55, 9.67)	5.1×10^{-12}	63/29	14.20 (7.91,25.49)	6.1×10^{-19}	28/29	2.28 (1.23,4.23)	8.6×10^{-3}
			0.43 (0.14,0.72), p=0.0037			0.44 (0.13,0.74), p=0.0055			-1.12 (-2.42,0.18), p=0.09	
Cadmium										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	3/9	0.53 (0.14, 2.02)	0.35	3/9	1.56 (0.40, 6.06)	0.52	0/9	Not applicable	NA
-	+	698/418	3.12 (2.54, 3.84)	4.6×10^{-27}	531/418	7.06 (5.33, 9.35)	2.0×10^{-42}	167/418	1.15 (0.88,1.50)	0.31
+	+	24/8	4.21 (1.78, 9.97)	1.1×10^{-3}	17/8	9.53 (3.74,24.27)	2.3×10^{-6}	7/8	1.69 (0.54,5.28)	0.36
			-0.50 (-1.67,0.67), p=0.4			0.20 (-0.56,0.96), p=0.6			-1.35 (-3.06,0.37), p=0.12	
Carbon monoxide										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	109/147	1.19 (0.85, 1.66)	0.31	46/147	1.49 (0.94, 2.35)	0.088	63/147	1.10 (0.74,1.65)	0.63
-	+	698/418	3.14 (2.55, 3.85)	1.2×10^{-27}	531/418	7.08 (5.36, 9.35)	2.9×10^{-43}	167/418	1.18 (0.90,1.54)	0.22
+	+	390/148	4.30 (3.21, 5.76)	1.7×10^{-22}	295/148	9.84 (6.85,14.14)	4.3×10^{-35}	95/148	1.55 (1.06,2.25)	0.023
			0.23 (0.02,0.43), p=0.032			0.23 (0.01,0.45), p=0.042			0.17 (-0.19,0.53), p=0.35	
Detergents										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	399/626	1.13 (0.91, 1.39)	0.26	164/626	1.37 (1.01, 1.85)	0.040	235/626	1.03 (0.81,1.32)	0.81

-	+	698/418	3.11 (2.53, 3.82)	1.6×10^{-27}	531/418	6.94 (5.27, 9.14)	2.2×10^{-43}	167/418	1.18 (0.90,1.53)	0.23
+	+	1272/655	3.36 (2.77, 4.07)	8.3×10^{-35}	951/655	7.30 (5.61, 9.52)	4.3×10^{-49}	321/655	1.36 (1.07,1.73)	0.011
			0.04 (-0.13,0.20), p=0.67			0.00 (-0.17,0.17), p=0.99			0.11 (-0.16,0.38), p=0.41	
Flour dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	7/9	1.47 (0.52, 4.17)	0.47	3/9	1.71 (0.42, 6.95)	0.45	4/9	1.19 (0.34,4.24)	0.78
-	+	698/418	3.09 (2.51, 3.80)	1.0×10^{-26}	531/418	6.97 (5.27, 9.22)	3.6×10^{-42}	167/418	1.15 (0.88,1.50)	0.31
+	+	26/15	3.03 (1.50, 6.12)	2.0×10^{-3}	17/15	7.20 (3.18,16.27)	2.1×10^{-6}	9/15	1.18 (0.47,2.98)	0.73
			-0.17 (-1.11,0.77), p=0.72			-0.07 (-0.96,0.82), p=0.88			-0.14 (-1.76,1.49), p=0.87	
Fungicides										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	10/11	1.64 (0.65, 4.11)	0.29	2/11	1.15 (0.24, 5.50)	0.86	8/11	2.07 (0.76,5.63)	0.16
-	+	698/418	3.09 (2.51, 3.80)	1.1×10^{-26}	531/418	6.93 (5.24, 9.17)	5.4×10^{-42}	167/418	1.14 (0.87,1.50)	0.33
+	+	35/9	6.77 (3.10,14.80)	1.7×10^{-6}	27/9	16.18 (6.98,37.53)	8.8×10^{-11}	8/9	2.33 (0.85,6.40)	0.10
			0.45 (-0.03,0.92), p=0.064			0.56 (0.19,0.93), p=0.0031			0.05 (-1.23,1.33), p=0.94	
Gasoline engine exhaust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	28/31	1.58 (0.88, 2.84)	0.12	11/31	2.30 (1.04, 5.06)	0.039	17/31	1.30 (0.65,2.59)	0.46
-	+	698/418	3.08 (2.50, 3.79)	1.7×10^{-26}	531/418	6.95 (5.25, 9.19)	5.2×10^{-42}	167/418	1.14 (0.87,1.49)	0.33
+	+	79/21	6.54 (3.73,11.46)	5.6×10^{-11}	60/21	17.06 (9.17,31.74)	3.3×10^{-19}	19/21	1.96 (0.92,4.15)	0.080
			0.44 (0.12,0.76), p=0.0073			0.52 (0.23,0.80), p=0.00041			0.26 (-0.40,0.92), p=0.43	
Lead										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	29/46	1.13 (0.67, 1.90)	0.65	16/46	1.78 (0.92, 3.42)	0.085	13/46	0.80 (0.40,1.60)	0.53
-	+	698/418	3.12 (2.54, 3.84)	2.8×10^{-27}	531/418	6.96 (5.27, 9.19)	1.4×10^{-42}	167/418	1.16 (0.89,1.51)	0.29
+	+	91/45	3.65 (2.39, 5.58)	2.0×10^{-9}	71/45	9.42 (5.77,15.39)	3.1×10^{-19}	20/45	1.06 (0.58,1.95)	0.84
			0.11 (-0.27,0.50), p=0.57			0.18 (-0.19,0.55), p=0.35			-0.09 (-0.81,0.63), p=0.8	
Oil mist										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	22/38	1.03 (0.57, 1.87)	0.91	10/38	1.51 (0.69, 3.34)	0.30	12/38	0.84 (0.40,1.77)	0.65
-	+	698/418	3.06 (2.49, 3.76)	2.4×10^{-26}	531/418	6.89 (5.21, 9.10)	4.8×10^{-42}	167/418	1.14 (0.87,1.49)	0.34
+	+	89/42	3.42 (2.18, 5.36)	9.0×10^{-8}	68/42	8.89 (5.26,15.01)	3.2×10^{-16}	21/42	0.99 (0.53,1.86)	0.99
			0.10 (-0.32,0.51), p=0.65			0.17 (-0.24,0.57), p=0.42			-0.01 (-0.76,0.73), p=0.97	
Pulp or paper dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	

+	-	45/67	1.18 (0.77, 1.81)	0.46	23/67	1.76 (1.00, 3.09)	0.051	22/67	0.93 (0.54,1.60)	0.80
-	+	698/418	3.10 (2.52, 3.81)	6.1×10^{-27}	531/418	7.01 (5.30, 9.27)	1.9×10^{-42}	167/418	1.17 (0.90,1.53)	0.25
+	+	161/79	3.38 (2.42, 4.72)	7.4×10^{-13}	126/79	7.89 (5.32,11.71)	9.8×10^{-25}	35/79	1.10 (0.69,1.75)	0.70
			0.03 (-0.30,0.36), p=0.86			0.02 (-0.33,0.36), p=0.93			0.00 (-0.60,0.61), p=0.99	
Quartz dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	48/49	1.65 (1.01, 2.70)	0.047	19/49	2.12 (1.10, 4.12)	0.025	29/49	1.44 (0.80,2.59)	0.22
-	+	698/418	3.11 (2.53, 3.82)	3.8×10^{-27}	531/418	6.87 (5.20, 9.07)	4.6×10^{-42}	167/418	1.16 (0.89,1.52)	0.27
+	+	161/55	5.26 (3.50, 7.90)	1.4×10^{-15}	114/55	12.42 (7.64,20.17)	2.5×10^{-24}	47/55	1.99 (1.19,3.33)	8.6×10^{-3}
			0.29 (0.00,0.57), p=0.047			0.36 (0.08,0.63), p=0.01			0.20 (-0.30,0.69), p=0.44	
Softwood dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	32/49	1.21 (0.72, 2.05)	0.48	10/49	1.17 (0.54, 2.56)	0.69	22/49	1.18 (0.64,2.19)	0.59
-	+	698/418	3.12 (2.54, 3.84)	3.4×10^{-27}	531/418	6.96 (5.26, 9.19)	2.9×10^{-42}	167/418	1.17 (0.89,1.52)	0.26
+	+	110/48	4.13 (2.70, 6.33)	6.8×10^{-11}	75/48	10.07 (6.07,16.72)	3.9×10^{-19}	35/48	1.62 (0.94,2.79)	0.080
			0.19 (-0.15,0.53), p=0.27			0.29 (-0.03,0.62), p=0.078			0.17 (-0.40,0.74), p=0.56	
Textile dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	28/49	0.90 (0.53, 1.52)	0.69	14/49	1.34 (0.68, 2.67)	0.40	14/49	0.66 (0.34,1.31)	0.24
-	+	698/418	3.11 (2.53, 3.83)	6.8×10^{-27}	531/418	7.06 (5.33, 9.35)	1.8×10^{-42}	167/418	1.15 (0.88,1.51)	0.30
+	+	72/36	3.04 (1.90, 4.85)	3.6×10^{-6}	52/36	6.98 (4.06,11.99)	2.1×10^{-12}	20/36	1.23 (0.65,2.34)	0.52
			-0.01 (-0.47,0.46), p=0.97			-0.06 (-0.60,0.48), p=0.82			-0.36 (-1.15,0.42), p=0.37	
Toluene										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	11/10	1.40 (0.55, 3.54)	0.48	5/10	2.31 (0.70, 7.64)	0.17	6/10	1.05 (0.34,3.22)	0.93
-	+	698/418	3.11 (2.53, 3.83)	7.7×10^{-27}	531/418	6.98 (5.27, 9.23)	4.1×10^{-42}	167/418	1.15 (0.88,1.50)	0.32
+	+	42/15	4.88 (2.54, 9.38)	2.0×10^{-6}	32/15	12.80 (6.25,26.20)	3.1×10^{-12}	10/15	1.66 (0.68,4.08)	0.26
			0.28 (-0.24,0.80), p=0.29			0.35 (-0.13,0.83), p=0.15			0.28 (-0.64,1.21), p=0.55	
Welding fume										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	13/26	0.85 (0.41, 1.77)	0.67	3/26	0.72 (0.20, 2.54)	0.61	10/26	0.90 (0.39,2.05)	0.79
-	+	698/418	3.11 (2.53, 3.83)	4.9×10^{-27}	531/418	7.00 (5.29, 9.26)	2.7×10^{-42}	167/418	1.17 (0.89,1.52)	0.26
+	+	84/28	5.60 (3.34, 9.41)	6.9×10^{-11}	62/28	13.69 (7.55,24.81)	6.7×10^{-18}	22/28	1.98 (1.01,3.88)	0.047
			-0.85 (-1.75,0.06), p=0.068			-0.99 (-2.08,0.09), p=0.071			-0.79 (-2.02,0.45), p=0.21	
Volatile sulphur compounds										

-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	36/56	1.05 (0.64, 1.73)	0.83	13/56	1.17 (0.57, 2.38)	0.67	23/56	0.99 (0.55,1.77)	0.97
-	+	698/418	3.09 (2.52, 3.81)	9.7×10^{-27}	531/418	6.95 (5.26, 9.19)	4.0×10^{-42}	167/418	1.14 (0.87,1.49)	0.33
+	+	105/46	3.83 (2.50, 5.85)	5.6×10^{-10}	77/46	8.84 (5.41,14.44)	3.4×10^{-18}	28/46	1.33 (0.76,2.33)	0.32
			0.18 (-0.17,0.53), p=0.32			0.19 (-0.17,0.56), p=0.29			-0.17 (-0.95,0.61), p=0.67	
Other agents in correlation with any of the sixteen independent partciles										
Aliphatic and alicyclic hydrocarbon solvents										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	9/13	1.02 (0.41, 2.58)	0.96	4/13	1.33 (0.38, 4.63)	0.65	5/13	0.80 (0.25,2.50)	0.70
-	+	698/418	3.10 (2.52, 3.81)	1.1×10^{-26}	531/418	6.99 (5.28, 9.25)	4.5×10^{-42}	167/418	1.15 (0.88,1.50)	0.30
+	+	43/18	3.99 (2.16, 7.36)	9.6×10^{-6}	30/18	9.25 (4.64,18.42)	2.5×10^{-10}	13/18	1.87 (0.84,4.17)	0.13
			0.22 (-0.30,0.74), p=0.41			0.21 (-0.33,0.75), p=0.45			-0.80 (-2.29,0.70), p=0.3	
Animal dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	30/48	1.12 (0.66, 1.88)	0.68	11/48	1.31 (0.62, 2.78)	0.48	19/48	1.00 (0.54,1.86)	10
-	+	698/418	3.11 (2.53, 3.82)	7.7×10^{-27}	531/418	6.97 (5.27, 9.22)	4.0×10^{-42}	167/418	1.15 (0.88,1.50)	0.30
+	+	77/44	3.17 (2.05, 4.89)	2.0×10^{-7}	54/44	6.52 (3.93,10.80)	3.7×10^{-13}	23/44	1.38 (0.77,2.48)	0.28
			-0.02 (-0.47,0.43), p=0.94			-0.12 (-0.64,0.41), p=0.66			-0.20 (-1.05,0.65), p=0.65	
Aromatic hydrocarbon solvents										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	12/14	1.14 (0.49, 2.66)	0.76	5/14	1.73 (0.55, 5.42)	0.34	7/14	0.87 (0.32,2.39)	0.79
-	+	698/418	3.10 (2.52, 3.81)	9.4×10^{-27}	531/418	6.98 (5.28, 9.24)	3.9×10^{-42}	167/418	1.15 (0.88,1.50)	0.32
+	+	47/17	4.60 (2.47, 8.57)	1.5×10^{-6}	35/17	11.93 (5.99,23.75)	1.7×10^{-12}	12/17	1.64 (0.71,3.80)	0.24
			0.29 (-0.17,0.76), p=0.22			0.35 (-0.09,0.80), p=0.12			-0.55 (-1.93,0.83), p=0.44	
Benzo(a)pyrene										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	57/73	1.35 (0.88, 2.07)	0.16	27/73	2.00 (1.14, 3.50)	0.015	30/73	1.08 (0.63,1.82)	0.79
-	+	698/418	3.12 (2.54, 3.83)	2.9×10^{-27}	531/418	7.03 (5.32, 9.29)	7.8×10^{-43}	167/418	1.17 (0.89,1.52)	0.26
+	+	169/82	3.34 (2.32, 4.82)	1.0×10^{-10}	131/82	8.32 (5.38,12.86)	1.6×10^{-21}	38/82	1.00 (0.60,1.66)	10
			-0.04 (-0.40,0.32), p=0.83			0.03 (-0.33,0.40), p=0.85			-0.24 (-0.99,0.51), p=0.53	
Chromium										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	11/27	0.74 (0.35, 1.60)	0.45	4/27	0.85 (0.28, 2.64)	0.78	7/27	0.67 (0.26,1.70)	0.40
-	+	698/418	3.07 (2.50, 3.77)	2.0×10^{-26}	531/418	6.95 (5.25, 9.19)	4.6×10^{-42}	167/418	1.13 (0.87,1.48)	0.36
+	+	46/20	3.73 (2.06, 6.73)	1.3×10^{-5}	37/20	10.01 (5.21,19.22)	4.5×10^{-12}	9/20	0.87 (0.36,2.11)	0.76

		-0.30 (-1.02,0.42), p=0.42			-0.46 (-1.36,0.44), p=0.31			-0.06 (-0.92,0.80), p=0.89		
Diesel engine exhaust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	60/71	1.32 (0.87, 2.01)	0.19	25/71	1.82 (1.03, 3.21)	0.040	35/71	1.12 (0.68,1.84)	0.65
-	+	698/418	3.07 (2.50, 3.78)	1.1×10^{-26}	531/418	6.95 (5.27, 9.18)	1.6×10^{-42}	167/418	1.14 (0.88,1.49)	0.33
+	+	199/69	4.72 (3.30, 6.75)	2.1×10^{-17}	152/69	11.80 (7.72,18.05)	4.7×10^{-30}	47/69	1.51 (0.94,2.42)	0.090
		0.28 (0.03,0.53), p=0.029			0.34 (0.10,0.58), p=0.0057			0.16 (-0.32,0.65), p=0.51		
Hardwood dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	31/49	1.17 (0.69, 1.99)	0.55	10/49	1.17 (0.53, 2.56)	0.69	21/49	1.12 (0.60,2.09)	0.72
-	+	698/418	3.12 (2.54, 3.84)	3.2×10^{-27}	531/418	6.97 (5.27, 9.22)	2.5×10^{-42}	167/418	1.17 (0.89,1.52)	0.26
+	+	108/47	4.14 (2.69, 6.36)	9.6×10^{-11}	73/47	10.01 (6.00,16.71)	1.1×10^{-18}	35/47	1.67 (0.97,2.88)	0.066
		0.20 (-0.14,0.54), p=0.24			0.29 (-0.05,0.62), p=0.091			0.23 (-0.31,0.76), p=0.4		
Herbicides										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	16/36	0.87 (0.45, 1.69)	0.68	5/36	0.84 (0.30, 2.41)	0.75	11/36	0.83 (0.38,1.79)	0.63
-	+	698/418	3.10 (2.52, 3.82)	9.0×10^{-27}	531/418	7.00 (5.29, 9.27)	3.9×10^{-42}	167/418	1.15 (0.88,1.50)	0.32
+	+	38/26	2.99 (1.70, 5.26)	1.5×10^{-4}	26/26	6.47 (3.39,12.34)	1.5×10^{-8}	12/26	1.19 (0.54,2.61)	0.66
		0.00 (-0.56,0.55), p=0.99			0.05 (-0.52,0.63), p=0.85			-0.19 (-1.15,0.78), p=0.7		
Insecticides										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	10/11	1.64 (0.65, 4.11)	0.29	2/11	1.15 (0.24, 5.50)	0.86	8/11	2.07 (0.76,5.63)	0.16
-	+	698/418	3.09 (2.51, 3.80)	1.1×10^{-26}	531/418	6.93 (5.24, 9.17)	5.4×10^{-42}	167/418	1.14 (0.87,1.50)	0.33
+	+	35/9	6.77 (3.10,14.80)	1.7×10^{-6}	27/9	16.18 (6.98,37.53)	8.8×10^{-11}	8/9	2.33 (0.85,6.40)	0.10
		0.45 (-0.03,0.92), p=0.064			0.56 (0.19,0.93), p=0.0031			0.05 (-1.23,1.33), p=0.94		
Iron										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	80/101	1.33 (0.92, 1.95)	0.13	31/101	1.61 (0.96, 2.70)	0.074	49/101	1.25 (0.80,1.97)	0.33
-	+	698/418	3.12 (2.54, 3.84)	2.3×10^{-27}	531/418	7.02 (5.32, 9.27)	6.2×10^{-43}	167/418	1.18 (0.91,1.54)	0.22
+	+	276/110	4.17 (3.01, 5.78)	1.2×10^{-17}	213/110	10.13 (6.80,15.07)	3.8×10^{-30}	63/110	1.32 (0.86,2.04)	0.20
		0.17 (-0.08,0.42), p=0.18			0.25 (0.00,0.50), p=0.052			-0.08 (-0.62,0.45), p=0.76		
Manmade mineral fibres										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	26/31	1.37 (0.74, 2.54)	0.31	12/31	2.38 (1.08, 5.26)	0.032	14/31	0.94 (0.44,2.00)	0.86
-	+	698/418	3.11 (2.53, 3.82)	4.3×10^{-27}	531/418	6.91 (5.23, 9.12)	3.9×10^{-42}	167/418	1.16 (0.89,1.52)	0.27

+	+	93/42	4.01 (2.52, 6.40)	5.4×10^{-9}	62/42	9.54 (5.47,16.64)	1.8×10^{-15}	31/42	1.63 (0.90,2.94)	0.11
			0.13 (-0.27,0.54), p=0.52			0.13 (-0.31,0.57), p=0.56			-0.45 (-1.38,0.47), p=0.34	
Other organic solvents										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	9/13	1.02 (0.41, 2.58)	0.96	4/13	1.33 (0.38, 4.63)	0.65	5/13	0.80 (0.25,2.50)	0.70
-	+	698/418	3.10 (2.52, 3.81)	1.1×10^{-26}	531/418	6.99 (5.28, 9.25)	4.5×10^{-42}	167/418	1.15 (0.88,1.50)	0.30
+	+	43/18	3.99 (2.16, 7.36)	9.6×10^{-6}	30/18	9.25 (4.64,18.42)	2.5×10^{-10}	13/18	1.87 (0.84,4.17)	0.13
			0.22 (-0.30,0.74), p=0.41			0.21 (-0.33,0.75), p=0.45			-0.80 (-2.29,0.70), p=0.3	
Plant dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	32/53	1.05 (0.63, 1.77)	0.84	11/53	1.13 (0.53, 2.42)	0.74	21/53	0.99 (0.54,1.82)	0.98
-	+	698/418	3.10 (2.52, 3.81)	8.4×10^{-27}	531/418	6.95 (5.25, 9.19)	4.4×10^{-42}	167/418	1.15 (0.88,1.50)	0.32
+	+	83/45	3.16 (2.04, 4.90)	2.5×10^{-7}	60/45	7.09 (4.28,11.75)	2.9×10^{-14}	23/45	1.15 (0.63,2.09)	0.65
			0.00 (-0.44,0.44), p=0.99			0.00 (-0.46,0.47), p=1			-0.01 (-0.76,0.74), p=0.98	
Polycyclic aromatic hydrocarbons										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	63/84	1.28 (0.86, 1.93)	0.23	28/84	1.76 (1.02, 3.03)	0.042	35/84	1.09 (0.66,1.79)	0.74
-	+	698/418	3.10 (2.52, 3.81)	4.8×10^{-27}	531/418	7.00 (5.30, 9.25)	9.0×10^{-43}	167/418	1.16 (0.89,1.51)	0.28
+	+	202/89	3.61 (2.54, 5.13)	7.1×10^{-13}	156/89	8.96 (5.89,13.63)	1.2×10^{-24}	46/89	1.08 (0.67,1.74)	0.76
			0.06 (-0.25,0.37), p=0.7			0.13 (-0.18,0.44), p=0.4			-0.16 (-0.81,0.50), p=0.64	
Stone and concrete										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	91/112	1.28 (0.89, 1.85)	0.19	36/112	1.61 (0.97, 2.66)	0.065	55/112	1.14 (0.74,1.76)	0.55
-	+	698/418	3.08 (2.51, 3.78)	6.5×10^{-27}	531/418	6.88 (5.22, 9.08)	2.0×10^{-42}	167/418	1.15 (0.88,1.50)	0.29
+	+	315/110	4.60 (3.35, 6.32)	3.6×10^{-21}	224/110	10.51 (7.12,15.52)	2.5×10^{-32}	91/110	1.83 (1.24,2.72)	2.5×10^{-3}
			0.27 (0.06,0.48), p=0.014			0.29 (0.06,0.52), p=0.013			0.29 (-0.03,0.62), p=0.078	
Wood dust										
-	-	240/460	1.00 ref		85/460	1.00 ref		155/460	1.00 ref	
+	-	32/49	1.21 (0.72, 2.05)	0.48	10/49	1.17 (0.54, 2.56)	0.69	22/49	1.18 (0.64,2.19)	0.59
-	+	698/418	3.12 (2.54, 3.84)	3.4×10^{-27}	531/418	6.96 (5.26, 9.19)	2.9×10^{-42}	167/418	1.17 (0.89,1.52)	0.26
+	+	110/48	4.13 (2.70, 6.33)	6.8×10^{-11}	75/48	10.07 (6.07,16.72)	3.9×10^{-19}	35/48	1.62 (0.94,2.79)	0.080
			0.19 (-0.15,0.53), p=0.27			0.29 (-0.03,0.62), p=0.078			0.17 (-0.40,0.74), p=0.56	

Supplementary Table 8. Additive interaction effects between occupational inhalable agents and HLA-SE alleles on the development of RA. Estimates were adjusted for age, sex, residential area, smoking, alcohol drinking, levels of education, body mass index and principal components 1-10. For the OR estimates that were not available due to the limited number of cases within the subgroup, 'not applicable' was marked in corresponding cells.

Occupational exposure	HLA-SE	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
		N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
Exposed to any agents										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	628/901	1.12 (0.91,1.38)	0.29	244/901	1.08 (0.81,1.45)	0.58	384/901	1.17 (0.91,1.5)	0.21
-	+	653/433	2.54 (2.04,3.16)	9.2×10^{-17}	492/433	4.89 (3.69,6.47)	2.4×10^{-28}	161/433	1.05 (0.79,1.4)	0.73
+	+	1871/1018	2.87 (2.36,3.49)	6.4×10^{-26}	1394/1018	5.41 (4.17,7.02)	5.3×10^{-37}	477/1018	1.25 (0.98,1.6)	0.068
			0.07 (-0.09,0.23), p=0.37			0.08 (-0.08,0.25), p=0.33			0.02 (-0.27,0.31), p=0.88	
The sixteen independent agents										
Asbestos										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	28/34	1.36 (0.72,2.6)	0.34	12/34	1.87 (0.83,4.21)	0.13	16/34	1.01 (0.46,2.22)	0.98
-	+	653/433	2.61 (2.09,3.25)	2.7×10^{-17}	492/433	5 (3.76,6.66)	1.9×10^{-28}	161/433	1.07 (0.8,1.43)	0.66
+	+	91/31	4.96 (2.92,8.41)	2.9×10^{-9}	66/31	9.97 (5.49,18.1)	4.1×10^{-14}	25/31	1.97 (1,3.88)	0.049
			0.4 (0.07,0.73), p=0.016			0.41 (0.08,0.75), p=0.016			0.46 (-0.05,0.96), p=0.076	
Cadmium										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	5/10	0.47 (0.11,2.04)	0.31	3/10	0.81 (0.15,4.45)	0.81	2/10	0.33 (0.04,2.99)	0.32
-	+	653/433	2.64 (2.11,3.3)	1.7×10^{-17}	492/433	5.1 (3.83,6.8)	1.3×10^{-28}	161/433	1.07 (0.8,1.43)	0.66
+	+	20/12	3.09 (1.31,7.27)	9.9×10^{-3}	16/12	6.23 (2.49,15.59)	9.4×10^{-5}	4/12	1.32 (0.37,4.81)	0.67
			-0.37 (-1.4,0.65), p=0.48			-0.26 (-1.38,0.86), p=0.65			-0.87 (-2.62,0.89), p=0.33	
Carbon monoxide										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	119/140	1.21 (0.85,1.73)	0.28	39/140	1.02 (0.62,1.67)	0.93	80/140	1.35 (0.89,2.06)	0.16
-	+	653/433	2.58 (2.07,3.21)	4.7×10^{-17}	492/433	4.98 (3.75,6.61)	1.8×10^{-28}	161/433	1.06 (0.79,1.41)	0.71
+	+	378/153	3.57 (2.61,4.87)	1.3×10^{-15}	294/153	7.04 (4.86,10.19)	4.6×10^{-25}	84/153	1.34 (0.89,2.01)	0.17
			0.22 (-0.01,0.44), p=0.058			0.29 (0.07,0.51), p=0.01			-0.05 (-0.55,0.44), p=0.83	
Detergents										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	438/590	1.15 (0.92,1.44)	0.21	169/590	1.11 (0.82,1.52)	0.50	269/590	1.22 (0.93,1.59)	0.14

-	+	653/433	2.54 (2.04,3.16)	1.0×10^{-16}	492/433	4.88 (3.68,6.47)	3.1×10^{-28}	161/433	1.06 (0.8,1.41)	0.69
+	+	1259/672	2.84 (2.31,3.49)	2.9×10^{-23}	940/672	5.39 (4.12,7.06)	1.0×10^{-34}	319/672	1.25 (0.96,1.61)	0.096
			0.05 (-0.12,0.23), p=0.56			0.07 (-0.1,0.25), p=0.41			-0.03 (-0.35,0.3), p=0.88	
Flour dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	10/10	1.89 (0.71,5)	0.20	3/10	1.38 (0.32,5.85)	0.66	7/10	2.1 (0.71,6.21)	0.18
-	+	653/433	2.62 (2.09,3.27)	2.4×10^{-17}	492/433	5.02 (3.77,6.68)	2.6×10^{-28}	161/433	1.08 (0.81,1.44)	0.61
+	+	22/12	2.64 (1.2,5.84)	0.016	14/12	5.45 (2.22,13.36)	2.1×10^{-4}	8/12	0.93 (0.31,2.81)	0.90
			-0.33 (-1.54,0.89), p=0.6			0.01 (-0.91,0.93), p=0.98			-1.33 (-4.75,2.09), p=0.45	
Fungicides										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	11/15	0.86 (0.34,2.19)	0.75	4/15	0.31 (0.04,2.47)	0.27	7/15	1.33 (0.49,3.6)	0.57
-	+	653/433	2.62 (2.1,3.27)	2.5×10^{-17}	492/433	5.04 (3.78,6.71)	2.3×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	33/4	13.67 (4.58,40.78)	2.7×10^{-6}	27/4	30.57 (9.76,95.76)	4.4×10^{-9}	6/4	4.47 (1.1,18.14)	0.036
			-4.27 (-9.94,1.4), p=0.14			-5.21 (-12.04,1.62), p=0.14			0.69 (0.16,1.21), p=0.01	
Gasoline engine exhaust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	25/25	1.85 (0.96,3.58)	0.068	8/25	1.61 (0.64,4.05)	0.31	17/25	1.99 (0.93,4.23)	0.076
-	+	653/433	2.61 (2.09,3.26)	2.9×10^{-17}	492/433	5.05 (3.79,6.72)	2.1×10^{-28}	161/433	1.07 (0.8,1.43)	0.67
+	+	79/28	4.92 (2.84,8.52)	1.4×10^{-8}	60/28	10.79 (5.88,19.77)	1.5×10^{-14}	19/28	1.7 (0.8,3.62)	0.17
			0.3 (-0.12,0.72), p=0.17			0.48 (0.16,0.79), p=0.003			-0.2 (-1.33,0.92), p=0.72	
Lead										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	24/56	0.77 (0.43,1.39)	0.39	9/56	0.83 (0.37,1.83)	0.64	15/56	0.77 (0.37,1.61)	0.49
-	+	653/433	2.62 (2.1,3.28)	1.8×10^{-17}	492/433	5.03 (3.78,6.7)	1.5×10^{-28}	161/433	1.08 (0.81,1.45)	0.60
+	+	82/36	3.57 (2.22,5.75)	1.5×10^{-7}	68/36	7.74 (4.52,13.23)	8.0×10^{-14}	14/36	1.12 (0.55,2.26)	0.76
			-0.45 (-1.09,0.2), p=0.17			-0.57 (-1.35,0.2), p=0.15			-0.24 (-1.12,0.64), p=0.59	
Oil mist										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	26/42	0.9 (0.49,1.66)	0.73	8/42	0.93 (0.39,2.19)	0.86	18/42	0.86 (0.41,1.82)	0.70
-	+	653/433	2.6 (2.08,3.24)	3.6×10^{-17}	492/433	5 (3.76,6.65)	2.2×10^{-28}	161/433	1.07 (0.8,1.43)	0.64
+	+	96/39	3.74 (2.29,6.11)	1.5×10^{-7}	76/39	8.15 (4.69,14.16)	9.2×10^{-14}	20/39	1.11 (0.55,2.23)	0.77
			-0.48 (-1.17,0.21), p=0.18			-0.65 (-1.48,0.19), p=0.13			-0.16 (-1.05,0.72), p=0.72	
Pulp or paper dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	

+	-	40/69	1.18 (0.74,1.91)	0.48	24/69	1.79 (1,3.19)	0.050	16/69	0.82 (0.43,1.55)	0.54
-	+	653/433	2.6 (2.08,3.25)	3.2×10^{-17}	492/433	5.04 (3.79,6.72)	1.6×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	170/74	3.16 (2.22,4.51)	1.6×10^{-10}	128/74	6.22 (4.12,9.4)	3.5×10^{-18}	42/74	1.31 (0.81,2.1)	0.27
			0.12 (-0.21,0.45), p=0.48			0.06 (-0.3,0.42), p=0.73			-0.39 (-1.15,0.37), p=0.32	
Quartz dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	49/47	1.63 (0.95,2.78)	0.075	18/47	1.56 (0.76,3.2)	0.23	31/47	1.69 (0.9,3.18)	0.10
-	+	653/433	2.62 (2.1,3.27)	1.7×10^{-17}	492/433	4.98 (3.75,6.62)	2.3×10^{-28}	161/433	1.06 (0.79,1.42)	0.69
+	+	149/56	4.68 (3,7.32)	1.1×10^{-11}	112/56	9.48 (5.68,15.8)	6.4×10^{-18}	37/56	1.68 (0.92,3.05)	0.091
			0.31 (0.01,0.61), p=0.046			0.42 (0.15,0.68), p=0.0024			-0.05 (-0.78,0.69), p=0.9	
Softwood dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	39/44	1.4 (0.81,2.4)	0.23	13/44	1.21 (0.57,2.56)	0.62	26/44	1.45 (0.77,2.75)	0.25
-	+	653/433	2.6 (2.08,3.24)	3.0×10^{-17}	492/433	5.01 (3.76,6.66)	2.0×10^{-28}	161/433	1.05 (0.79,1.41)	0.73
+	+	96/48	3.22 (2.04,5.1)	5.6×10^{-7}	68/48	6.53 (3.83,11.13)	5.1×10^{-12}	28/48	1.44 (0.78,2.63)	0.24
			0.07 (-0.36,0.5), p=0.75			0.20 (-0.19,0.6), p=0.32			-0.05 (-0.84,0.74), p=0.91	
Textile dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	33/39	0.97 (0.55,1.72)	0.92	9/39	0.73 (0.3,1.77)	0.49	24/39	1.11 (0.58,2.14)	0.75
-	+	653/433	2.65 (2.12,3.32)	1.3×10^{-17}	492/433	5.15 (3.86,6.87)	7.1×10^{-29}	161/433	1.08 (0.81,1.45)	0.61
+	+	76/48	2.2 (1.39,3.49)	7.8×10^{-4}	58/48	4.62 (2.75,7.78)	8.4×10^{-9}	18/48	0.81 (0.41,1.61)	0.56
			0.16 (-0.26,0.58), p=0.46			0.05 (-0.4,0.5), p=0.83			-0.46 (-1.76,0.83), p=0.48	
Toluene										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	17/8	2.47 (0.94,6.52)	0.067	9/8	3.86 (1.24,12.03)	0.020	8/8	1.88 (0.6,5.88)	0.28
-	+	653/433	2.64 (2.11,3.3)	1.6×10^{-17}	492/433	5.07 (3.81,6.76)	1.5×10^{-28}	161/433	1.07 (0.8,1.44)	0.64
+	+	40/15	3.48 (1.73,6.97)	4.5×10^{-4}	29/15	7.1 (3.32,15.17)	4.2×10^{-7}	11/15	1.42 (0.52,3.83)	0.49
			-0.18 (-1.21,0.84), p=0.73			-0.12 (-1.1,0.86), p=0.81			-0.38 (-2.33,1.58), p=0.7	
Welding fume										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	22/29	1.18 (0.6,2.34)	0.63	6/29	0.83 (0.29,2.39)	0.73	16/29	1.31 (0.6,2.84)	0.49
-	+	653/433	2.61 (2.09,3.26)	2.5×10^{-17}	492/433	5.02 (3.77,6.69)	2.0×10^{-28}	161/433	1.08 (0.81,1.45)	0.60
+	+	73/25	4.55 (2.59,8.02)	1.5×10^{-7}	58/25	9.82 (5.24,18.42)	1.1×10^{-12}	15/25	1.33 (0.59,3.02)	0.49
			0.39 (0.03,0.74), p=0.035			-0.99 (-2.14,0.17), p=0.093			-0.04 (-1.08,1), p=0.94	
Volatile sulphur compounds										

-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	38/52	0.86 (0.5,1.47)	0.57	13/52	0.64 (0.28,1.45)	0.28	25/52	0.92 (0.49,1.71)	0.79
-	+	653/433	2.6 (2.08,3.25)	3.2×10^{-17}	492/433	5.09 (3.82,6.78)	1.3×10^{-28}	161/433	1.05 (0.79,1.41)	0.74
+	+	118/42	4 (2.54,6.31)	2.4×10^{-9}	88/42	8.13 (4.84,13.64)	2.2×10^{-15}	30/42	1.55 (0.85,2.85)	0.15
			-0.59 (-1.28,0.09), p=0.09			-0.67 (-1.44,0.1), p=0.089			-0.55 (-1.56,0.45), p=0.28	
Other agents in correlation with any of the sixteen independent agents										
Wood dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	39/44	1.4 (0.81,2.4)	0.23	13/44	1.21 (0.57,2.56)	0.62	26/44	1.45 (0.77,2.75)	0.25
-	+	653/433	2.6 (2.08,3.24)	3.0×10^{-17}	492/433	5.01 (3.76,6.66)	2.0×10^{-28}	161/433	1.05 (0.79,1.41)	0.73
+	+	96/48	3.22 (2.04,5.1)	5.6×10^{-7}	68/48	6.53 (3.83,11.13)	5.1×10^{-12}	28/48	1.44 (0.78,2.63)	0.24
			0.07 (-0.36,0.5), p=0.75			0.2 (-0.19,0.6), p=0.32			-0.05 (-0.84,0.74), p=0.91	
Aliphatic and alicyclic hydrocarbon solvents										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	14/10	1.52 (0.61,3.79)	0.36	7/10	1.9 (0.62,5.83)	0.26	7/10	1.16 (0.39,3.49)	0.79
-	+	653/433	2.63 (2.1,3.28)	2.2×10^{-17}	492/433	5.09 (3.82,6.79)	1.4×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	43/19	3.24 (1.67,6.28)	4.9×10^{-4}	30/19	5.92 (2.82,12.44)	2.7×10^{-6}	13/19	1.82 (0.75,4.41)	0.18
			0.03 (-0.71,0.77), p=0.94			-0.01 (-0.79,0.77), p=0.98			0.33 (-0.56,1.21), p=0.47	
Animal dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	31/42	0.88 (0.49,1.58)	0.67	10/42	0.68 (0.28,1.68)	0.40	21/42	0.9 (0.45,1.78)	0.76
-	+	653/433	2.62 (2.09,3.27)	2.4×10^{-17}	492/433	5.09 (3.82,6.78)	1.3×10^{-28}	161/433	1.06 (0.79,1.41)	0.71
+	+	87/46	3.12 (1.97,4.94)	1.2×10^{-6}	63/46	5.67 (3.37,9.54)	6.4×10^{-11}	24/46	1.46 (0.78,2.72)	0.23
			-0.24 (-0.79,0.32), p=0.4			-0.18 (-0.73,0.37), p=0.53			-0.48 (-1.49,0.54), p=0.36	
Aromatic hydrocarbon solvents										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	18/11	1.78 (0.75,4.21)	0.19	10/11	2.82 (1.02,7.81)	0.046	8/11	1.22 (0.43,3.52)	0.71
-	+	653/433	2.63 (2.11,3.29)	1.8×10^{-17}	492/433	5.08 (3.81,6.77)	1.5×10^{-28}	161/433	1.07 (0.8,1.43)	0.64
+	+	46/18	3.48 (1.8,6.73)	2.1×10^{-4}	32/18	6.78 (3.27,14.09)	2.8×10^{-7}	14/18	1.69 (0.68,4.16)	0.26
			0.02 (-0.72,0.76), p=0.96			-0.02 (-0.81,0.77), p=0.97			0.23 (-0.76,1.22), p=0.65	
Benzo(a)pyrene										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	58/68	1.14 (0.71,1.82)	0.58	20/68	1.13 (0.6,2.13)	0.71	38/68	1.11 (0.63,1.96)	0.72
-	+	653/433	2.59 (2.07,3.23)	4.1×10^{-17}	492/433	4.98 (3.75,6.62)	2.1×10^{-28}	161/433	1.06 (0.79,1.41)	0.71
+	+	171/78	3.21 (2.17,4.73)	4.7×10^{-9}	134/78	6.47 (4.14,10.11)	2.7×10^{-16}	37/78	1.07 (0.62,1.84)	0.80

			0.15 (-0.17,0.47), p=0.36			0.21 (-0.1,0.52), p=0.19			-0.09 (-0.81,0.64), p=0.82	
Chromium										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	13/29	0.66 (0.3,1.46)	0.31	5/29	0.84 (0.29,2.42)	0.75	8/29	0.53 (0.19,1.46)	0.22
-	+	653/433	2.6 (2.08,3.25)	3.5×10^{-17}	492/433	5.02 (3.77,6.68)	2.4×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	49/16	4.37 (2.26,8.45)	1.2×10^{-5}	38/16	9.46 (4.65,19.26)	5.8×10^{-10}	11/16	1.26 (0.48,3.32)	0.64
			-0.81 (-1.9,0.29), p=0.15			-0.92 (-2.2,0.37), p=0.16			-0.61 (-1.85,0.62), p=0.33	
Diesel engine exhaust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	59/68	1.36 (0.86,2.16)	0.19	21/68	1.29 (0.69,2.42)	0.43	38/68	1.35 (0.79,2.31)	0.27
-	+	653/433	2.57 (2.06,3.21)	6.3×10^{-17}	492/433	5.03 (3.78,6.69)	1.8×10^{-28}	161/433	1.05 (0.78,1.4)	0.76
+	+	193/74	3.79 (2.6,5.54)	5.2×10^{-12}	149/74	8.11 (5.24,12.56)	6.3×10^{-21}	44/74	1.35 (0.81,2.25)	0.25
			0.23 (-0.07,0.52), p=0.13			0.34 (0.09,0.6), p=0.0089			-0.04 (-0.69,0.62), p=0.91	
Hardwood dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	39/44	1.39 (0.81,2.39)	0.23	13/44	1.2 (0.57,2.54)	0.63	26/44	1.45 (0.77,2.75)	0.25
-	+	653/433	2.6 (2.08,3.24)	3.0×10^{-17}	492/433	5.01 (3.76,6.66)	2.0×10^{-28}	161/433	1.05 (0.79,1.41)	0.73
+	+	95/48	3.17 (2,5.02)	9.0×10^{-7}	67/48	6.38 (3.73,10.91)	1.2×10^{-11}	28/48	1.44 (0.78,2.63)	0.24
			0.06 (-0.38,0.5), p=0.8			0.18 (-0.22,0.59), p=0.38			-0.05 (-0.84,0.74), p=0.91	
Herbicides										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	18/31	0.72 (0.34,1.52)	0.39	6/31	0.42 (0.11,1.58)	0.20	12/31	0.77 (0.33,1.77)	0.54
-	+	653/433	2.61 (2.09,3.26)	3.1×10^{-17}	492/433	5.06 (3.8,6.75)	1.8×10^{-28}	161/433	1.06 (0.79,1.41)	0.71
+	+	47/28	2.8 (1.57,4.99)	4.8×10^{-4}	33/28	5.17 (2.69,9.93)	8.2×10^{-7}	14/28	1.26 (0.57,2.79)	0.57
			-0.18 (-0.81,0.45), p=0.58			-0.13 (-0.78,0.51), p=0.68			-0.41 (-1.51,0.7), p=0.47	
Insecticides										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	11/15	0.86 (0.34,2.19)	0.75	4/15	0.31 (0.04,2.47)	0.27	7/15	1.33 (0.49,3.6)	0.57
-	+	653/433	2.62 (2.1,3.27)	2.5×10^{-17}	492/433	5.04 (3.78,6.71)	2.3×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	33/4	13.67 (4.58,40.78)	2.7×10^{-6}	27/4	30.57 (9.76,95.76)	4.4×10^{-9}	6/4	4.47 (1.1,18.14)	0.036
			-4.27 (-9.94,1.4), p=0.14			-5.21 (-12.04,1.62), p=0.14			0.69 (0.16,1.21), p=0.01	
Iron										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	86/96	1.28 (0.86,1.93)	0.23	28/96	1.13 (0.64,1.98)	0.67	58/96	1.36 (0.84,2.21)	0.21
-	+	653/433	2.59 (2.07,3.23)	3.5×10^{-17}	492/433	4.96 (3.74,6.6)	1.9×10^{-28}	161/433	1.08 (0.81,1.44)	0.62

+	+	271/102	3.88 (2.73,5.52)	3.9×10^{-14}	211/102	7.68 (5.11,11.56)	1.2×10^{-22}	60/102	1.35 (0.84,2.16)	0.22
			0.26 (0.02,0.51), p=0.037			0.34 (0.1,0.57), p=0.0047			-0.07 (-0.65,0.51), p=0.82	
Manmade mineral fibres										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	31/30	1.48 (0.78,2.82)	0.23	13/30	1.84 (0.81,4.17)	0.15	18/30	1.29 (0.6,2.81)	0.52
-	+	653/433	2.61 (2.09,3.26)	2.1×10^{-17}	492/433	4.98 (3.75,6.63)	2.3×10^{-28}	161/433	1.07 (0.8,1.43)	0.67
+	+	84/41	3.48 (2.09,5.81)	1.7×10^{-6}	61/41	7.23 (4.02,12.99)	3.7×10^{-11}	23/41	1.33 (0.66,2.65)	0.42
			0.11 (-0.35,0.57), p=0.64			0.19 (-0.25,0.63), p=0.39			-0.03 (-0.92,0.87), p=0.96	
Other organic solvents										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	14/10	1.52 (0.61,3.79)	0.36	7/10	1.9 (0.62,5.83)	0.26	7/10	1.16 (0.39,3.49)	0.79
-	+	653/433	2.63 (2.1,3.28)	2.2×10^{-17}	492/433	5.09 (3.82,6.79)	1.4×10^{-28}	161/433	1.07 (0.8,1.43)	0.65
+	+	43/19	3.24 (1.67,6.28)	4.9×10^{-4}	30/19	5.92 (2.82,12.44)	2.7×10^{-6}	13/19	1.82 (0.75,4.41)	0.18
			0.03 (-0.71,0.77), p=0.94			-0.01 (-0.79,0.77), p=0.98			0.33 (-0.56,1.21), p=0.47	
Plant dust										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	32/49	0.82 (0.46,1.43)	0.48	10/49	0.54 (0.22,1.32)	0.18	22/49	0.89 (0.47,1.7)	0.73
-	+	653/433	2.61 (2.09,3.26)	2.7×10^{-17}	492/433	5.1 (3.82,6.8)	1.3×10^{-28}	161/433	1.05 (0.79,1.41)	0.74
+	+	93/44	3.19 (2.01,5.08)	9.5×10^{-7}	69/44	6.41 (3.78,10.85)	4.9×10^{-12}	24/44	1.27 (0.67,2.42)	0.46
			-0.29 (-0.86,0.27), p=0.31			-0.35 (-0.97,0.28), p=0.27			-0.31 (-1.22,0.6), p=0.5	
Polycyclic aromatic hydrocarbons										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	64/78	1.1 (0.71,1.72)	0.66	21/78	1.05 (0.57,1.94)	0.88	43/78	1.11 (0.65,1.89)	0.71
-	+	653/433	2.58 (2.07,3.22)	5.2×10^{-17}	492/433	4.95 (3.73,6.58)	2.6×10^{-28}	161/433	1.06 (0.79,1.42)	0.69
+	+	205/85	3.47 (2.38,5.04)	7.4×10^{-11}	160/85	7.01 (4.56,10.78)	7.0×10^{-19}	45/85	1.16 (0.69,1.92)	0.58
			0.23 (-0.05,0.51), p=0.11			0.29 (0.01,0.56), p=0.039			-0.01 (-0.65,0.63), p=0.97	
Stone and concrete										
-	-	251/414	1.00 ref		102/414	1.00 ref		149/414	1.00 ref	
+	-	91/109	1.26 (0.84,1.88)	0.26	32/109	1.16 (0.67,2)	0.60	59/109	1.31 (0.82,2.08)	0.26
-	+	653/433	2.58 (2.07,3.22)	4.1×10^{-17}	492/433	5 (3.76,6.65)	1.8×10^{-28}	161/433	1.05 (0.78,1.39)	0.76
+	+	296/116	3.83 (2.72,5.38)	1.2×10^{-14}	219/116	7.53 (5.03,11.28)	9.9×10^{-23}	77/116	1.56 (1.01,2.43)	0.047
			0.26 (0.02,0.49), p=0.033			0.32 (0.08,0.55), p=0.0086			0.14 (-0.31,0.58), p=0.55	

Supplementary Table 9. Additive interaction effects between occupational inhalable agents and smoking on the development of RA. Estimates were adjusted for age, sex, residential area, alcohol drinking, levels of education, and body mass index.

Occupational exposure	Smoking	Overall RA			ACPA-positive subtype			ACPA-negative subtype		
		N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P	N (case / control)	OR (95%CI)	P
Exposed to any agents										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
-	+	900/1919	1.09 (0.94,1.25)	0.25	540/1919	1.13 (0.96,1.34)	0.15	360/1919	1.01 (0.83,1.23)	0.94
+	-	668/1082	1.49 (1.28,1.73)	2.0×10^{-7}	463/1082	1.8 (1.51,2.15)	1.2×10^{-10}	205/1082	1.07 (0.86,1.34)	0.52
+	+	2035/2452	1.95 (1.71,2.22)	7.6×10^{-24}	1388/2452	2.37 (2.02,2.77)	6.0×10^{-27}	647/2452	1.42 (1.18,1.71)	1.8×10^{-4}
AP (95%CI), P		0.19 (0.08,0.31), P=0.0011			0.18 (0.06,0.31), P=0.0043			0.24 (0.05,0.43), P=0.014		
The sixteen independent agents										
Asbestos										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	28/35	2.03 (1.18,3.49)	0.010	17/35	2.74 (1.44,5.18)	2.0×10^{-3}	11/35	1.35 (0.65,2.82)	0.42
-	+	668/1082	1.51 (1.29,1.76)	1.7×10^{-7}	463/1082	1.87 (1.55,2.25)	4.1×10^{-11}	205/1082	1.06 (0.85,1.33)	0.59
+	+	115/95	2.96 (2.11,4.16)	3.5×10^{-10}	71/95	3.89 (2.6,5.83)	4.0×10^{-11}	44/95	2.02 (1.29,3.17)	2.2×10^{-3}
AP (95%CI), P		0.14 (-0.28,0.57), p=0.51			0.07 (-0.44,0.59), p=0.78			0.3 (-0.24,0.84), p=0.28		
Cadmium										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	7/15	0.92 (0.36,2.34)	0.86	5/15	1.26 (0.44,3.58)	0.66	2/15	0.58 (0.12,2.66)	0.48
-	+	668/1082	1.51 (1.29,1.76)	1.8×10^{-7}	463/1082	1.87 (1.55,2.25)	4.6×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	22/26	1.78 (0.97,3.26)		17/26	2.6 (1.34,5.03)	4.5×10^{-3}	5/26	0.9 (0.33,2.47)	0.84
AP (95%CI), P		-0.23 (-1.13,0.67), p=0.61			0.18 (-0.54,0.91), p=0.62			-0.25 (-1.44,0.95), p=0.69		
Carbon monoxide										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	125/233	1.25 (0.95,1.64)	0.11	76/233	1.44 (1.04,2)	0.030	49/233	1.05 (0.72,1.55)	0.79
-	+	668/1082	1.51 (1.29,1.76)	1.5×10^{-7}	463/1082	1.84 (1.53,2.21)	6.8×10^{-11}	205/1082	1.08 (0.86,1.35)	0.51
+	+	452/422	2.5 (2.04,3.08)	2.7×10^{-18}	309/422	3.25 (2.55,4.15)	2.3×10^{-21}	143/422	1.64 (1.23,2.2)	9.0×10^{-4}
AP (95%CI), P		0.3 (0.14,0.46), p=0.00035			0.3 (0.12,0.47), p=0.00098			0.31 (0.03,0.59), p=0.03		
Detergents										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	571/1222	1.04 (0.89,1.21)	0.60	342/1222	1.07 (0.89,1.29)	0.45	229/1222	0.99 (0.79,1.23)	0.89

-	+	668/1082	1.49 (1.28,1.73)	2.2×10^{-7}	463/1082	1.79 (1.5,2.15)	1.8×10^{-10}	205/1082	1.08 (0.87,1.35)	0.49
+	+	1409/1570	2.06 (1.8,2.37)	3.1×10^{-25}	966/1570	2.48 (2.11,2.92)	1.7×10^{-27}	443/1570	1.53 (1.26,1.87)	1.7×10^{-5}
AP (95%CI), P		0.26 (0.14,0.37), p=0.000014			0.25 (0.12,0.37), p=0.00013			-0.43 (-0.76,-0.1), p=0.01		
Flour dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	14/18	1.74 (0.83,3.64)	0.14	7/18	1.76 (0.7,4.44)	0.23	7/18	1.53 (0.6,3.93)	0.37
-	+	668/1082	1.51 (1.29,1.76)	1.7×10^{-7}	463/1082	1.86 (1.54,2.24)	5.3×10^{-11}	205/1082	1.07 (0.86,1.35)	0.54
+	+	21/26	1.71 (0.93,3.15)	0.080	13/26	2.2 (1.08,4.48)	0.030	8/26	1.12 (0.48,2.65)	0.79
AP (95%CI), P		-0.31 (-1.38,0.75), p=0.57			-0.19 (-1.29,0.9), p=0.73			-0.43 (-2.15,1.29), p=0.62		
Fungicides										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	14/20	1.45 (0.7,2.98)	0.32	9/20	1.74 (0.75,4.01)	0.20	5/20	1.1 (0.39,3.11)	0.85
-	+	668/1082	1.51 (1.29,1.76)	1.7×10^{-7}	463/1082	1.87 (1.55,2.25)	4.1×10^{-11}	205/1082	1.07 (0.85,1.34)	0.57
+	+	36/22	3.95 (2.25,6.91)	1.6×10^{-6}	25/22	5.27 (2.85,9.75)	1.2×10^{-7}	11/22	2.61 (1.2,5.67)	0.020
AP (95%CI), P		0.5 (0.13,0.88), p=0.0088			0.51 (0.11,0.91), p=0.013			0.55 (0,1.1), p=0.051		
Gasoline engine exhaust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	22/50	0.96 (0.56,1.65)	0.88	11/50	0.97 (0.48,1.95)	0.93	11/50	0.88 (0.43,1.8)	0.72
-	+	668/1082	1.5 (1.29,1.75)	2.6×10^{-7}	463/1082	1.85 (1.54,2.22)	7.6×10^{-11}	205/1082	1.06 (0.85,1.33)	0.60
+	+	94/76	2.72 (1.9,3.91)	4.9×10^{-8}	64/76	4.07 (2.7,6.13)	2.3×10^{-11}	30/76	1.5 (0.9,2.49)	0.12
AP (95%CI), P		-0.84 (-1.55,-0.14), p=0.018			-1.22 (-2.13,-0.3), p=0.0093			-0.53 (-1.41,0.36), p=0.24		
Lead										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	39/67	1.29 (0.84,1.99)	0.24	27/67	1.71 (1.05,2.8)	0.030	12/67	0.8 (0.42,1.56)	0.52
-	+	668/1082	1.5 (1.29,1.75)	2.5×10^{-7}	463/1082	1.85 (1.54,2.22)	6.4×10^{-11}	205/1082	1.05 (0.84,1.32)	0.64
+	+	97/138	1.62 (1.2,2.2)	1.9×10^{-3}	68/138	2.25 (1.58,3.2)	6.6×10^{-6}	29/138	0.94 (0.59,1.49)	0.78
AP (95%CI), P		-0.11 (-0.55,0.34), p=0.65			-0.14 (-0.64,0.36), p=0.58			-0.07 (-0.71,0.57), p=0.82		
Oil mist										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	23/66	0.74 (0.44,1.23)	0.25	15/66	0.96 (0.52,1.76)	0.90	8/66	0.49 (0.22,1.07)	0.070
-	+	668/1082	1.51 (1.29,1.76)	1.6×10^{-7}	463/1082	1.86 (1.54,2.24)	5.0×10^{-11}	205/1082	1.07 (0.86,1.34)	0.54
+	+	110/95	2.78 (1.99,3.87)	1.6×10^{-9}	75/95	3.84 (2.62,5.62)	5.0×10^{-12}	35/95	1.68 (1.05,2.68)	0.030
AP (95%CI), P		-1.01 (-1.65,-0.38), p=0.0017			-1.09 (-1.88,-0.3), p=0.0071			-1.05 (-1.86,-0.23), p=0.012		

Pulp or paper dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	76/128	1.33 (0.97,1.83)	0.080	50/128	1.57 (1.08,2.28)	0.020	26/128	0.98 (0.61,1.57)	0.94
-	+	668/1082	1.51 (1.29,1.76)	1.5×10^{-7}	463/1082	1.87 (1.55,2.25)	3.0×10^{-11}	205/1082	1.06 (0.84,1.32)	0.64
+	+	163/180	2.09 (1.63,2.7)	9.3×10^{-9}	123/180	2.94 (2.21,3.91)	1.1×10^{-13}	40/180	1.11 (0.74,1.65)	0.62
AP (95%CI), P		0.12 (-0.16,0.4), p=0.4			0.17 (-0.11,0.45), p=0.23			-0.06 (-0.65,0.52), p=0.83		
Quartz dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	51/70	1.78 (1.17,2.69)	6.6×10^{-3}	29/70	2.05 (1.24,3.39)	5.0×10^{-3}	22/70	1.44 (0.82,2.51)	0.20
-	+	668/1082	1.5 (1.29,1.75)	2.5×10^{-7}	463/1082	1.85 (1.54,2.23)	5.3×10^{-11}	205/1082	1.05 (0.84,1.32)	0.66
+	+	192/151	3.07 (2.3,4.09)	3.3×10^{-14}	125/151	4.13 (2.94,5.81)	3.4×10^{-16}	67/151	1.96 (1.32,2.92)	9.1×10^{-4}
AP (95%CI), P		0.26 (-0.02,0.53), p=0.064			0.3 (0.01,0.58), p=0.041			0.24 (-0.2,0.68), p=0.28		
Softwood dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	45/82	1.31 (0.87,1.98)	0.20	24/82	1.39 (0.83,2.34)	0.21	21/82	1.17 (0.67,2.03)	0.58
-	+	668/1082	1.51 (1.29,1.76)	1.6×10^{-7}	463/1082	1.86 (1.55,2.24)	4.0×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	117/118	2.33 (1.7,3.2)	1.6×10^{-7}	75/118	3.06 (2.11,4.44)	3.5×10^{-9}	42/118	1.55 (1,2.4)	0.050
AP (95%CI), P		0.22 (-0.08,0.52), p=0.16			0.26 (-0.05,0.58), p=0.1			0.2 (-0.29,0.69), p=0.42		
Textile dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	33/66	0.91 (0.58,1.44)	0.70	16/66	0.8 (0.45,1.45)	0.47	17/66	1.06 (0.58,1.93)	0.85
-	+	668/1082	1.51 (1.3,1.77)	1.3×10^{-7}	463/1082	1.86 (1.55,2.24)	4.2×10^{-11}	205/1082	1.08 (0.86,1.35)	0.51
+	+	85/103	1.62 (1.17,2.25)	3.8×10^{-3}	60/103	2.17 (1.5,3.14)	4.3×10^{-5}	25/103	1.03 (0.63,1.68)	0.92
AP (95%CI), P		-0.13 (-0.56,0.3), p=0.56			-0.27 (-0.75,0.21), p=0.27			-0.11 (-0.91,0.68), p=0.78		
Toluene										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	18/25	1.75 (0.92,3.31)	0.090	14/25	2.65 (1.32,5.32)	6.0×10^{-3}	4/25	0.74 (0.25,2.24)	0.60
-	+	668/1082	1.51 (1.29,1.76)	1.7×10^{-7}	463/1082	1.87 (1.55,2.25)	4.0×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	47/36	2.84 (1.76,4.58)	1.9×10^{-5}	29/36	3.8 (2.19,6.58)	2.0×10^{-6}	18/36	1.99 (1.05,3.76)	0.030
AP (95%CI), P		0.2 (-0.32,0.73), p=0.44			0.07 (-0.59,0.74), p=0.83			-1.11 (-2.5,0.29), p=0.12		
Welding fume										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	22/29	1.95 (1.07,3.54)	0.030	12/29	2.08 (1,4.32)	0.050	10/29	1.7 (0.77,3.72)	0.19

-	+	668/1082	1.51 (1.3,1.77)	1.4×10^{-7}	463/1082	1.88 (1.56,2.26)	2.6×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	89/82	2.65 (1.85,3.82)	1.4×10^{-7}	62/82	4.02 (2.64,6.12)	8.5×10^{-11}	27/82	1.38 (0.82,2.33)	0.23
AP (95%CI), P			0.07 (-0.44,0.58), p=0.78			0.26 (-0.18,0.71), p=0.25			-0.27 (-1.36,0.81), p=0.62	
Volatile sulphur compounds										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	42/97	0.81 (0.54,1.22)	0.31	18/97	0.64 (0.37,1.12)	0.12	24/97	0.93 (0.55,1.55)	0.77
-	+	668/1082	1.5 (1.28,1.74)	2.9×10^{-7}	463/1082	1.84 (1.53,2.22)	7.4×10^{-11}	205/1082	1.06 (0.84,1.32)	0.63
+	+	126/94	2.95 (2.14,4.06)	3.2×10^{-11}	90/94	4.21 (2.94,6.04)	5.2×10^{-15}	36/94	1.62 (1.02,2.56)	0.040
AP (95%CI), P			-1.1 (-1.74,-0.46), p=0.00076			-1.48 (-2.28,-0.67), p=0.00033			-0.6 (-1.4,0.19), p=0.14	
Other agents in correlation with any of the sixteen independent agents										
Aliphatic and alicyclic hydrocarbon solvents										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	16/27	1.47 (0.77,2.8)	0.25	11/27	1.94 (0.93,4.06)	0.080	5/27	0.94 (0.35,2.53)	0.89
-	+	668/1082	1.51 (1.29,1.76)	2.1×10^{-7}	463/1082	1.86 (1.55,2.24)	4.6×10^{-11}	205/1082	1.06 (0.85,1.33)	0.60
+	+	48/35	2.94 (1.82,4.74)	9.7×10^{-6}	30/35	3.73 (2.16,6.44)	2.4×10^{-6}	18/35	2.07 (1.09,3.91)	0.030
AP (95%CI), P			0.33 (-0.11,0.77), p=0.14			0.25 (-0.29,0.79), p=0.37			-1.01 (-2.5,0.49), p=0.19	
Animal dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	39/86	0.97 (0.64,1.46)	0.87	17/86	0.77 (0.44,1.35)	0.35	22/86	1.09 (0.65,1.85)	0.74
-	+	668/1082	1.5 (1.28,1.75)	2.6×10^{-7}	463/1082	1.85 (1.54,2.23)	6.1×10^{-11}	205/1082	1.06 (0.84,1.32)	0.64
+	+	92/95	2.22 (1.6,3.07)	1.8×10^{-6}	63/95	2.9 (2,4.2)	1.9×10^{-8}	29/95	1.45 (0.9,2.33)	0.13
AP (95%CI), P			-0.5 (-1.03,0.03), p=0.066			-0.69 (-1.3,-0.09), p=0.025			0.2 (-0.32,0.73), p=0.45	
Aromatic hydrocarbon solvents										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	18/29	1.49 (0.8,2.76)	0.21	14/29	2.26 (1.15,4.45)	0.020	4/29	0.64 (0.21,1.88)	0.41
-	+	668/1082	1.51 (1.29,1.76)	1.9×10^{-7}	463/1082	1.87 (1.55,2.24)	4.3×10^{-11}	205/1082	1.06 (0.85,1.33)	0.60
+	+	54/44	2.56 (1.64,4)	3.6×10^{-5}	33/44	3.34 (2,5.59)	4.4×10^{-6}	21/44	1.78 (0.98,3.22)	0.060
AP (95%CI), P			0.22 (-0.26,0.7), p=0.37			0.06 (-0.56,0.69), p=0.84			-1.02 (-2.2,0.17), p=0.092	
Benzo(a)pyrene										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	51/102	1.2 (0.82,1.77)	0.35	34/102	1.62 (1.03,2.55)	0.040	17/102	0.75 (0.42,1.33)	0.32
-	+	668/1082	1.51 (1.29,1.76)	1.6×10^{-7}	463/1082	1.85 (1.54,2.23)	5.2×10^{-11}	205/1082	1.07 (0.85,1.34)	0.56
+	+	212/204	2.48 (1.91,3.22)	1.1×10^{-11}	142/204	3.33 (2.45,4.53)	1.9×10^{-14}	70/204	1.57 (1.09,2.28)	0.020

AP (95%CI), P		0.31 (0.08,0.54), p=0.0076			0.26 (-0.01,0.52), p=0.059			-0.71 (-1.34,-0.07), p=0.03		
Chromium										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	13/41	0.68 (0.35,1.31)	0.25	11/41	1.06 (0.52,2.14)	0.88	2/41	0.22 (0.05,0.95)	0.040
-	+	668/1082	1.52 (1.3,1.77)	1.3×10^{-7}	463/1082	1.88 (1.56,2.26)	2.8×10^{-11}	205/1082	1.07 (0.85,1.34)	0.56
+	+	56/51	2.69 (1.76,4.12)	5.1×10^{-6}	36/51	3.55 (2.18,5.77)	3.4×10^{-7}	20/51	1.89 (1.05,3.4)	0.030
AP (95%CI), P		-0.99 (-1.78,-0.19), p=0.015			0.46 (0.13,0.78), p=0.0059			-1.49 (-2.6,-0.38), p=0.0085		
Diesel engine exhaust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	61/119	1.13 (0.79,1.6)	0.51	39/119	1.43 (0.95,2.16)	0.090	22/119	0.77 (0.46,1.3)	0.33
-	+	668/1082	1.5 (1.28,1.74)	2.8×10^{-7}	463/1082	1.83 (1.52,2.2)	1.2×10^{-10}	205/1082	1.06 (0.85,1.33)	0.59
+	+	238/218	2.42 (1.89,3.09)	2.3×10^{-12}	161/218	3.3 (2.48,4.4)	3.5×10^{-16}	77/218	1.46 (1.03,2.07)	0.030
AP (95%CI), P		0.33 (0.12,0.54), p=0.002			0.32 (0.09,0.54), p=0.007			-0.59 (-1.17,-0.01), p=0.048		
Hardwood dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	44/81	1.3 (0.86,1.97)	0.22	23/81	1.35 (0.8,2.28)	0.26	21/81	1.19 (0.68,2.06)	0.55
-	+	668/1082	1.51 (1.29,1.76)	1.6×10^{-7}	463/1082	1.86 (1.55,2.24)	4.1×10^{-11}	205/1082	1.07 (0.85,1.34)	0.57
+	+	115/116	2.33 (1.69,3.2)	2.2×10^{-7}	74/116	3.08 (2.12,4.48)	4.0×10^{-9}	41/116	1.53 (0.98,2.38)	0.060
AP (95%CI), P		0.22 (-0.08,0.53), p=0.15			0.28 (-0.03,0.59), p=0.076			0.18 (-0.33,0.69), p=0.49		
Herbicides										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	21/58	0.77 (0.45,1.32)	0.35	6/58	0.42 (0.17,1.02)	0.050	15/58	1.03 (0.55,1.94)	0.92
-	+	668/1082	1.51 (1.3,1.76)	1.5×10^{-7}	463/1082	1.87 (1.56,2.25)	3.2×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	48/52	2.37 (1.53,3.69)	1.3×10^{-4}	35/52	3.55 (2.17,5.83)	5.0×10^{-7}	13/52	1.19 (0.6,2.34)	0.62
AP (95%CI), P		-0.72 (-1.45,0.01), p=0.052			-1.21 (-2.15,-0.27), p=0.012			0.08 (-0.72,0.87), p=0.85		
Insecticides										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	14/20	1.45 (0.7,2.98)	0.32	9/20	1.74 (0.75,4.01)	0.20	5/20	1.1 (0.39,3.11)	0.85
-	+	668/1082	1.51 (1.29,1.76)	1.7×10^{-7}	463/1082	1.87 (1.55,2.25)	4.1×10^{-11}	205/1082	1.07 (0.85,1.34)	0.57
+	+	36/22	3.95 (2.25,6.91)	1.6×10^{-6}	25/22	5.27 (2.85,9.75)	1.2×10^{-7}	11/22	2.61 (1.2,5.67)	0.020
AP (95%CI), P		0.5 (0.13,0.88), p=0.0088			0.51 (0.11,0.91), p=0.013			0.55 (0,1.1), p=0.051		
Iron										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	

+	-	86/157	1.27 (0.93,1.74)	0.14	55/157	1.55 (1.07,2.24)	0.020	31/157	0.93 (0.59,1.47)	0.75
-	+	668/1082	1.52 (1.3,1.77)	1.1×10^{-7}	463/1082	1.86 (1.55,2.23)	3.7×10^{-11}	205/1082	1.08 (0.86,1.35)	0.53
+	+	323/296	2.58 (2.04,3.25)	1.5×10^{-15}	217/296	3.36 (2.55,4.42)	4.6×10^{-18}	106/296	1.71 (1.23,2.37)	1.3×10^{-3}
AP (95%CI), P		0.31 (0.12,0.5), p=0.0014			0.28 (0.07,0.5), p=0.0083			-0.65 (-1.24,-0.06), p=0.03		
Manmade mineral fibres										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	29/48	1.46 (0.87,2.43)	0.15	16/48	1.75 (0.93,3.29)	0.080	13/48	1.09 (0.55,2.18)	0.80
-	+	668/1082	1.51 (1.29,1.76)	1.8×10^{-7}	463/1082	1.87 (1.55,2.25)	3.6×10^{-11}	205/1082	1.06 (0.85,1.33)	0.61
+	+	106/91	2.9 (2.03,4.13)	4.3×10^{-9}	69/91	4.23 (2.78,6.43)	1.4×10^{-11}	37/91	1.68 (1.03,2.74)	0.040
AP (95%CI), P		0.32 (0.01,0.63), p=0.043			0.38 (0.07,0.7), p=0.018			0.31 (-0.19,0.82), p=0.23		
Other organic solvents										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	16/27	1.46 (0.77,2.8)	0.25	11/27	1.94 (0.92,4.06)	0.080	5/27	0.93 (0.35,2.52)	0.89
-	+	668/1082	1.51 (1.29,1.76)	2.0×10^{-7}	463/1082	1.87 (1.55,2.25)	4.4×10^{-11}	205/1082	1.06 (0.85,1.33)	0.59
+	+	48/36	2.84 (1.77,4.56)	1.6×10^{-5}	30/36	3.6 (2.09,6.21)	3.7×10^{-6}	18/36	1.97 (1.05,3.72)	0.040
AP (95%CI), P		0.31 (-0.15,0.76), p=0.19			0.22 (-0.33,0.78), p=0.43			-0.92 (-2.36,0.52), p=0.21		
Plant dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	36/88	0.76 (0.49,1.18)	0.22	13/88	0.51 (0.27,0.96)	0.040	23/88	0.93 (0.54,1.57)	0.77
-	+	668/1082	1.5 (1.29,1.75)	2.1×10^{-7}	463/1082	1.86 (1.54,2.23)	5.0×10^{-11}	205/1082	1.06 (0.85,1.33)	0.61
+	+	100/94	2.44 (1.75,3.4)	1.7×10^{-7}	72/94	3.57 (2.45,5.19)	3.3×10^{-11}	28/94	1.29 (0.78,2.13)	0.32
AP (95%CI), P		-0.78 (-1.34,-0.22), p=0.0065			-1.18 (-1.9,-0.47), p=0.0012			-0.29 (-1.01,0.44), p=0.44		
Polycyclic aromatic hydrocarbons										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	59/127	1.09 (0.76,1.55)	0.65	41/127	1.47 (0.97,2.21)	0.070	18/127	0.65 (0.38,1.13)	0.13
-	+	668/1082	1.51 (1.29,1.76)	1.5×10^{-7}	463/1082	1.85 (1.54,2.23)	4.9×10^{-11}	205/1082	1.07 (0.85,1.34)	0.56
+	+	249/229	2.57 (2.01,3.3)	9.6×10^{-14}	165/229	3.37 (2.52,4.51)	3.6×10^{-16}	84/229	1.71 (1.21,2.42)	2.6×10^{-3}
AP (95%CI), P		0.38 (0.19,0.57), p=0.000095			0.31 (0.08,0.54), p=0.007			-0.92 (-1.55,-0.29), p=0.0041		
Stone and concrete										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	98/173	1.26 (0.93,1.69)	0.14	57/173	1.43 (1,2.06)	0.050	41/173	1.04 (0.69,1.57)	0.86
-	+	668/1082	1.49 (1.28,1.73)	3.6×10^{-7}	463/1082	1.82 (1.52,2.19)	1.2×10^{-10}	205/1082	1.05 (0.84,1.32)	0.65
+	+	369/321	2.56 (2.04,3.21)	2.6×10^{-16}	241/321	3.32 (2.55,4.33)	7.4×10^{-19}	128/321	1.69 (1.24,2.31)	9.2×10^{-4}

AP (95%CI), P		0.32 (0.14,0.5), p=0.00044			0.32 (0.13,0.51), p=0.0011			0.35 (0.07,0.64), p=0.015		
Wood dust										
-	-	430/1032	1.00 ref		251/1032	1.00 ref		179/1032	1.00 ref	
+	-	45/82	1.31 (0.87,1.98)	0.20	24/82	1.39 (0.83,2.34)	0.21	21/82	1.17 (0.67,2.03)	0.58
-	+	668/1082	1.51 (1.29,1.76)	1.6×10^{-7}	463/1082	1.86 (1.55,2.24)	4.0×10^{-11}	205/1082	1.07 (0.85,1.34)	0.58
+	+	117/118	2.33 (1.7,3.2)	1.6×10^{-7}	75/118	3.06 (2.11,4.44)	3.5×10^{-9}	42/118	1.55 (1,2.4)	0.050
AP (95%CI), P		0.22 (-0.08,0.52), p=0.16			0.26 (-0.05,0.58), p=0.1			0.2 (-0.29,0.69), p=0.42		

Supplementary Methods

During the period of 1996-2017, with a response rate of 94% in cases and 77% in controls, 4,251 cases and 6,934 controls participated in EIRA. The mean duration from symptom onset to RA diagnosis was approximately 10 months (1). Specifically, a previous study on inclusion levels and potential bias in recruitment of cases and controls has shown that little bias exists in our EIRA materials (2). Information regarding demographics, socioeconomic status, work history, environmental exposures and lifestyle was collected by self-administrated questionnaires with extensive questions covering those aspects. Blood samples were collected for antibody test and genotyping. Anti-citrulline antibodies were assayed among cases using the Immunoscan-RA Mark2 ELISA test (Euro-Diagnostica, Malmo, Sweden). An antibody level exceeding 25 units/ml was defined as ACPA-positive RA, otherwise ACPA-negative RA. Genotyping was performed based on the Illumina Immunochip primarily targeting the known immunity-related genes (Immuno-Chip) or a 600K Illumina global screening array. All genetic data were imputed to the 1000 Genome Phase3 v5 reference panel and had undergone thorough quality controls (SNP genotyping call rate > 95% in both cases and controls; minor allele frequency > 1% in both cases and controls; Hardy-Weinberg equilibrium P-value > 1×10^{-5} in controls; in addition, subjects with > 5% missing genotypes, evidence of relatedness or non-European ancestry were excluded). Population stratification was examined using the principal component approach (PCA). Outliers were identified and deleted through a five-round trimming step that was iteratively executed.

Occupational inhalable agents

For each participant, we retrieved their employment history (job titles, start year and end year) for working periods prior to the index year. We estimated the probability of exposure to occupational inhalable agents for each of their jobs according to a job-exposure matrix (JEM) developed for working conditions in Sweden which contained assessment of prevalence and concentration of 47 inhalable agents. We then calculated a semi-quantitative exposure through weighting the working years (years from start to end of each job, single or multiple jobs) by prevalence and concentration of the corresponding agents. To reduce potential misclassification, only common agents with prevalence > 50% in the respective job category were retained in the calculation. We next summed up the semi-quantitative exposure per agent per participant. These exposures were classified into binary variables as ever exposed *v.s.* never exposed (to a particular agent) with zero as cut-off.

Genetic risk score and HLA-SE alleles

The hitherto largest GWAS for RA was conducted involving >100,000 subjects of European and Asian ancestries, including participants from EIRA (4). We obtained the genetic summary statistics for the European-ancestral subpopulations from this GWAS and meta-analyzed these summary statistics after excluding participants from EIRA using a fix-effect model in METAL, which resulted in 13,264 RA cases and 42,879 controls. We then computed the genetic risk score (GRS) for EIRA participants using

LDpred2 software with this RA GWAS summary statistics. LDpred2 is a Bayesian-based method that estimates posterior mean effect sizes from GWAS summary statistics and constructs GRS by summing the RA-risk alleles across the whole genome and weighting each risk allele by its posterior mean effect size (5). On the other hand, genotyping for HLA-SE alleles in EIRA was performed by SSP-PCR (8) or by imputation with SNP2HLA.

Binary smoking status vs. pack-years of smoking as a covariate

EIRA collects smoking-related data in two parts – first asking each participant's smoking status (never vs. ever) and subsequently asking those who answered "ever or currently smoking" for their smoking intensity (number of cigarettes per day) during different periods of time, allowing us to calculate the dose of smoking as number of pack-years. It is perhaps not surprising, due to difficulties in recall, that the quantitative data on dose (pack-years of smoking) had around 700 more missing observations than the qualitative data on status (never vs. ever smoking). To obtain the maximum sample size available for this study, we decided to use binary smoking status (never vs. ever) in main analysis. Since pack-years of smoking is considered a more precise measure of smoking, here we performed a separate analysis adjusting for pack-years of smoking (continuous variable). However, such adjustment did not alter our results substantially. As shown in **Supplementary Figure 2**, all estimates remained largely unchanged in both the direction and the magnitude across two different ways of adjustments. Nevertheless, significance shrank slightly possibly due to exclusion of additional missing observations.

Statistical analysis

To account for potential correlations among inhalable agents, we calculated Pearson's correlation coefficients pair-wising all 32 agents. We set the significant P-threshold as 1.0×10^{-4} (0.05/496 pairs) and the correlation coefficient threshold as 0.40 (moderate correlation). Then a "clumping" strategy was performed to obtain independent collections of inhalable agents. Briefly, we sorted agents on their association P-values with RA and arranged agents by P-values from the smallest to the largest. We took the first (the most significant) agent as index agent and clumped any agents correlated with the index agent on a correlation coefficient > 0.40 and a $P_{correlation} < 1.0\times10^{-4}$. We iteratively repeated the procedure until no more agent was removed.

To explore the G×E or E×E interaction effect among inhalable agents, smoking and genetic predisposition (high GRS or carrying HLA-SE alleles), we estimated the additive interaction defined as departure from the additivity of effects, where sufficient cause interaction occurs when the joint effect of two contributory causes exceeds the sum of their independent effects (9). We calculated effects (here, odds ratios, ORs) comparing double-exposed individuals (OR_{11}) and single-exposed individuals (OR_{10} and OR_{01}) with the reference group (OR_{00} non-exposed individuals). We subsequently calculated attributable proportion due to interaction (AP) using the formula $AP=(OR_{11}-OR_{10}-OR_{01}+1)/OR_{11}$. AP is

the proportion of the incidence among individuals exposed to two interacting factors that is attributable to the interaction *per se*, thus an AP greater than 0 indicates presence of interaction (10).

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